AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
N/A	1

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0003	23 AUG 2002		DACW09-02-B-0009

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
U.S. ARMY ENGINEER DISTRICT, LOS ANGELES P.O. BOX 532711 LOS ANGELES, CALIFRONIA 90053-2325			

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*	(√)	9A. AMENDMENT OF SOLICITATION NO.
	X	DACW09-02-B-0009
		9B. DATED *(SEE ITEM 11)* 5 SEP 2002 (BID OPENING DATE)
		10A. MODIFICATION OF CONTRACTS/ORDER NO.
		10B. DATED *(SEE ITEM 13)*
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

UPPER FLAMINGO DIVERSION CHANNEL (Flamingo Detention Basin to El Camino Road), CLARK COUNTY, NEVADA

THE BID OPENING DATE IS HEREBY CHANGED TO 5 SEPTEMBER 2002.

CONTINUED ON NEXT SHEET.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY *(Signature of Contracting Officer)*	16C. DATE SIGNED

UPPER FLAMINGO DIVERSION CHANNEL, LAS VEGAS WASH AND TRIBUTARIES (TROPICANA AND FLAMINGO WASHES), CLARK COUNTY, NEVADA (Continued)

BLOCK 14 – Continued

REPLACE the SF 1442 with the enclosed SF 1442.

REPLACE the Table of Contents with the enclosed Table of Contents for clarification purposes.

REPLACE the following Specification Sections in the Original Solicitation with the enclosed Specification Sections for clarification purposes:

Section 00010
Section 00800
Section 01200
Section 01270
Section 01330
Section 01330b Submittal Register
Section 02300
Section 02380
Section 02722
Section 02741
Section 03301
Section 05502

REPLACE THE FOLLOWING DRAWINGS FILES –

T02_03.cal	**196/1110**	**INDEX TO CONTRACT DRAWINGS ABBREVIATIONS, AND SYMBOLS**
T03_03.cal	**196/1111**	**SURVEY CONTROL MAP**
T04_03.cal	**196/1112**	**WORK LIMITS, STA. 71+55.214 TO STA. 55+00.000**
T05_03.cal	**196/1113**	**WORK LIMITS, STA. 55+00.000 TO STA. 39+00.000**
T06_03.cal	**196/1114**	**TABLE OF COORDINATE POINT NUMBERS, R/W**
C01_03.cal	**196/1116**	**PLAN AND PROFILE, STA. 71+55.214 TO STA. 68+00.000**
C10_03.cal	**196/1125**	**PLAN AND PROFILE, STA. 47+00.000 TO STA. 44+00.000**
C11_03.cal	**196/1126**	**PLAN AND PROFILE, STA. 44+00.000 TO STA. 41+00.000**
C14_03.cal	**196/1129**	**PLAN AND PROFILE, BUFFALO LATERAL**
C19_03.cal	**196/1134**	**CROSS SECTIONS, STA. 71+55.214 TO STA. 68+32.825**
C20_03.cal	**196/1135**	**CROSS SECTIONS, STA. 67+80.000 TO STA. 62+40.000**
C21_03.cal	**196/1136**	**CROSS SECTIONS, STA. 62+00.000 TO STA. 49+64.000**
C22_03.cal	**196/1137**	**CROSS SECTIONS, STA. 48+00.000 TO STA. 46+30.000**
C23_03.cal	**196/1138**	**CROSS SECTIONS, STA. 45+52.447 TO STA. 44+00.000**
C24_03.cal	**196/1139**	**CROSS SECTIONS, STA. 43+30.000 TO STA. 42+74.370**
C27_03.cal	**196/1142**	**GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000**
S20_03.cal	**196/1163**	**DROP STRUCTURE AT STA. 48+67.994**

END OF SF-30

PROJECT TABLE OF CONTENTS

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO. DACW09-02-B-0009	2. TYPE OF SOLICITATION ☒ SEALED BID *(IFB)* ☐ NEGOTIATED *(RFP)*	3. DATE ISSUED 30 JUL 2002	PAGE OF PAGES

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. W81EYN-2149-9008	6. PROJECT NO.

7. ISSUED BY CODE	8. ADDRESS OFFER TO
DEPARTMENT OF THE ARMY L.A. DISTRICT, CORPS OF ENGINEERS ATTN: CESPLCT-E, SANDY HALL P.O. BOX 532711 LOS ANGELES, CA 90053-2325	SEE ITEM 7

9. FOR INFORMATION CALL:	A. NAME SANDY HALL	B. TELEPHONE NO. *(Include area code) (NO COLLECT CALLS)* (213) 452-3243

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date)*:
UPPER FLAMINGO DIVERSION CHANNEL (FLAMINGO DETENTION BASIN TO EL CAMINO ROAD), CLARK COUNTY, NEVADA

THE ESTIMATED COST OF THIS ACQUISITION IS $10,000,000 TO $25,000,000.

THE PROJECT CONSISTS OF CONSTRUCTION OF APPROXIMATELY 3,250 METERS OF CHANNEL TO INCLUDE RECTANGULAR REINFORCED CONCRETE CHANNEL; REINFORCED BOX CULVERTS; CHANNEL TRANSITION STRUCTURE, 2 LATERAL CONFLUENCE, 2 INVERT ACCESS RAMPS; SIDE DRAINS; AGGREGATE COURSE/ASPHALT PAVEMENT ROADS; DETOUR ROADS; RELOCATION OR WATER SEWER AND GAS UTILITIES, MISCELLANEOUS STREET IMPROVEMENTS, CHAIN LINK FENCE, SAFETY RAILS AND INCIDENTALS. EXCAVATION CONSIST OF EXCAVATION, COMPACTED FILL AND DISPOSAL OF EXCESS EXCAVATED MATERIALS TO MANDATORY DISPOSAL SITES AND FILLING OF EXISTING WASHES.

BIDDERS PLEASE NOTE: THIS PROJECT MAY BE DELAYED, CANCELLED OR REVISED AT ANY TIME DURING THE SOLICITATION, NEGOTIATION AND / OR FINAL AWARD PROCESS.

THIS IS A 100% UNRESTRICTED PROCUREMENT.

11. The Contractor shall begin performance within 10 calendar days and complete it within 540 calendar days after receiving

☐ award, ☒ notice to proceed. This performance period is ☒ mandatory, ☐ negotiable. *(See* Section 00800 .*)*

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how may calendar days after award in Item 12B.)* ☒ YES ☐ NO	12B. CALENDAR DAYS 10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

** A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8 by 1:00 P.M *(hour)* local time 5 September 02 *(date)*. If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☒ is, ☐ is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 90 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

OFFER ***(Must be fully completed by offeror)***

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*	15. TELEPHONE NO. *(Include area code)*
	16. REMITTANCE ADDRESS *(Include only if different than Item 14)*
Cage Code:_____ Duns No.: _____	
CODE FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.*

AMOUNTS ▶	SEE BID SCHEDULE OF PRICES

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS
(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD ***(To be completed by Government)***

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 Copies unless otherwise specified)* ▶	ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C 2304(c) ( ) ☐ 41 U.S.C 253(c) ( )
26. ADMINISTERED BY CODE		27. PAYMENT WILL BE MADE BY

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.

☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation is hereby accepted as to the items listed. This award con- summates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)*	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

STANDARD FORM 1442 BACK (REV. 4-85)

USAPPC V1.00

DOCUMENT TABLE OF CONTENTS

DIVISION 00 - DOCUMENTS

SECTION 00010

BID SCHEDULE

-- End of Document Table of Contents --

SECTION 00010

BID SCHEDULE

PART 1 GENERAL

Note : Some of the lump sum items reference drawings and plans that utilize English units of measurements.

1.1 **Base Bid (Item 0001 through Item 0051)**

Item	Description	Quantity	Unit	Unit Price	Amount
0001	TRAFFIC CONTROL, **ENTIRE PROJECT INCLUDING OPTION ITEM No. 1 AND OPTION ITEM No. 2**	1.00	LS	$___.__	$_____.___
0002	DIVERSION AND CONTROL OF WATER, **ENTIRE PROJECT INCLUDING OPTION ITEM No. 1 AND OPTION ITEM No. 2**	1.00	LS	$___.__	$_____.___
0003	CLEAR SITE AND REMOVE OBSTRUCTIONS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+29.000 TO STA. 69+80.000**	1.00	LS	$___.__	$_____.___
0004	EXCAVATION, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+29.000 TO STA. 69+80.000**	**232,936**	m^3	$___.__	$_____.___
0005	COMPACTED FILL, CHANNEL, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000 TO STA. 69+80.000**	**222,254**	m^3	$___.__	$_____.___
0006	**COMPACTED FILL, EXCESS SATISFACTORY EXCAVATED MATERIAL IN DISPOSAL SITE - STA. 49+20.000 TO STA. 42+00.000**	**12,044**	**m^3**	**$___.__**	**$_____.___**
0007	CONCRETE, CHANNEL INVERT SLAB, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000	**2,733**	m^3	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0008	CONCRETE, CHANNEL WALLS, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000	**2,882**	m^3	$___.__	$_____.___
0009	CONCRETE OVERFLOW STRUCTURES	1.00	LS	$___.__	$_____.___
0010	GROUTED RIPRAP, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+20.372** TO STA. 69+80.000	**2,544**	m^3	$___.__	$_____.___
0011	REINFORCING STEEL, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000	**562**	t	$___.__	$_____.___
0012	AGGREGATE BASE COURSE, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000	**1,807**	t	$___.__	$_____.___
0013	ASPHALT CONCRETE PAVEMENT, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000	**1,172**	t	$___.__	$_____.___
0014	WEEPHOLE SYSTEM, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+14.894 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000	1.00	LS	$___.__	$_____.___
0015	BOX CONDUIT @ TORREY PINES DRIVE, STA. 42+52.904 TO STA. 42+95.576	1.00	LS	$___.__	$_____.___
0016	CHANNEL BOX CONDUIT, STA. 51+75.702 TO STA. 62+00.000	1.00	LS	$___.__	$_____.___
0017	INVERT ACCESS RAMP, STA. 66+16.692 TO STA. 66+80.000	1.00	LS	$___.__	$_____.___
0018	BOX CONDUIT @ TIOGA WAY, STA. 68+14.537 TO STA. 68+51.117	1.00	LS	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0019	CONFLUENCE/INVERT TRANSITION FOR FLAMINGO CHANNEL, STA. 68+51.117 to STA. 69+53.335, AND A PORTION OF BUFFALO LATERAL, STA. 10+00.000 to STA. 10+76.563.	1.00	LS	$___.__	$_____.___
0020	BOX CONDUIT @ BUFFALO DRIVE, **STA. 70+34.000 TO STA. 70+58.784**	1.00	LS	$___.__	$_____.___
0021	TRAPEZOIDAL TO RECTANGULAR CHANNEL TRANSITION, STA 70+95.214 TO STA. 71+55.214	1.00	LS	$___.__	$_____.___
0022	BUFFALO LATERAL, STA. 10+76.563 TO STA. 12+10.198	1.00	LS	$___.__	$_____.___
0023	SIDE DRAIN, STA. 42+78.750 RT.	1.00	LS	$___.__	$_____.___
0024	SIDE DRAIN, STA. 55+03.050 RT.	1.00	LS	$___.__	$_____.___
0025	SIDE DRAIN, STA. 56+23.050 LT.	1.00	LS	$___.__	$_____.___
0026	SIDE DRAIN, STA. 56+23.050 RT.	1.00	LS	$___.__	$_____.___
0027	SIDE DRAIN, STA. 58+21.761 RT.	1.00	LS	$___.__	$_____.___
0028	SIDE DRAIN, STA. 58+30.000 LT.	1.00	LS	$___.__	$_____.___
0029	SIDE DRAIN, STA. 61+30.000 RT.	1.00	LS	$___.__	$_____.___
0030	SLOTTED CHAMBER, STA. 42+62.879, RT	1.00	LS	$___.__	$_____.___
0031	21 FOOT CHANNEL	1.00	LS	$___.__	$_____.___
0032	INLET STRUCTURE, SINGLE RCP STA. 55+03.050 RT	1.00	LS	$___.__	$_____.___
0033	43 FOOT CHANNEL & TENAYA WAY ROAD MODIFICATIONS	1.00	LS	$___.__	$_____.___
0034	INLET STRUCTURE, DOUBLE RCP STA. 56+23.050 LT AND RT	1.00	LS	$___.__	$_____.___
0035	TIOGA STREET REMOVAL AND RECONSTRUCTION	1.00	LS	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0036	TENAYA/DIABLO STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 58+21.761 RT	1.00	LS	$___.__	$_____.___
0037	TENAYA/ELDRIDGE STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 61+30.000 RT	1.00	LS	$___.__	$_____.___
0038	MANHOLES FOR BOX CONDUITS, CULVERTS, AND LATERALS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 46+51.092	1.00	LS	$___.__	$_____.___
0039	ACCESS ROAD @ DURANGO HIGH SCHOOL	1.00	LS	$___.__	$_____.___
0040	ROAD DETOURS @ BUFFALO/TIOGA	1.00	LS	$___.__	$_____.___
0041	CHAIN LINK FENCE, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000	**2,055**	m	$___.__	$_____.___
0042	PIPE SAFETY RAILING, EXCEPT BETWEEN STA. 46+52.000 TO STA. 45+14.894 AND BETWEEN STA. 70+20.000 TO STA. 70+21.000	**1,144**	m	$___.__	$_____.___
0043	CABLE SAFETY RAILING, EXCEPT BETWEEN STA. 70+20.372 TO STA. 69+80.000	**1,600**	m	$___.__	$_____.___
0044	DOUBLE SWING GATES, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000	16	ea	$___.__	$_____.___
0045	SOIL STABILIZER, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000	**25,370**	**m^2**	$___.__	$_____.___
0046	STATION MARKINGS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000	1.00	LS	$___.__	$_____.___
0047	AS-BUILT DRAWINGS	1.00	LS	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0048	DEWEY STREET REMOVAL AND REPLACEMENT, STA. 56+00.000 TO STA. 51+75.702	1.00	LS	$___.__	$_____.___
0049	0.250 M (10 INCH) SEWER @ TENAYA WAY	1.00	LS	$___.__	$_____.___
0050	0.300 M (12 INCH) WATERLINE @ BUFFALO DRIVE	1.00	LS	$___.__	$_____.___
0051	LADDER SYSTEMS, EXCEPT BETWEEN **STA. 51+75.702 TO STA. 45+14.894**	1.00	LS	$___.__	$_____.___

1.2 **Option Item No. 1 (Item 0052 through Item 0089)**

Item	Description	Quantity	Unit	Unit Price	Amount
0052	CLEAR SITE AND REMOVE OBSTRUCTIONS, **STA. 51+75.702 TO STA. 45+14.894**	1.00	LS	$___.__	$_____.___
0053	EXCAVATION, **STA. 51+75.702 TO STA. 45+14.894**	66,600	m^3	$___.__	$_____.___
0054	COMPACTED FILL, CHANNEL, **STA. 51+75.702 TO STA. 45+14.894**	72,200	m^3	$___.__	$_____.___
0055	CONCRETE, CHANNEL INVERT SLAB, **STA. 46+51.092 TO STA. 45+14.894**	**285**	m^3	$___.__	$_____.___
0056	CONCRETE, CHANNEL WALLS, **STA. 46+51.092 TO STA. 45+14.894**	**300**	m^3	$___.__	$_____.___
0057	REINFORCING STEEL, **STA. 46+51.092 TO STA. 45+14.894**	**59**	t	$___.__	$_____.___
0058	AGGREGATE BASE COURSE, **STA. 46+51.092 TO STA. 45+14.894**	**188**	t	$___.__	$_____.___
0059	ASPHALT CONCRETE PAVEMENT, **STA. 46+51.092 TO STA. 45+14.894**	**122**	t	$___.__	$_____.___
0060	WEEPHOLE SYSTEM, **STA. 46+51.092 TO STA. 45+14.894**	1.00	LS	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0061	INVERT ACCESS RAMP, STA. 45+14.894 to STA. 45+76.000	1.00	LS	$___.__	$_____.___
0062	BOX CONDUIT @ REDWOOD STREET, STA. 46+51.092 TO STA. 46+87.668	1.00	LS	$___.__	$_____.___
0063	CHANNEL BOX CONDUIT, STA. 46+87.668 TO STA. 47+04.000	1.00	LS	$___.__	$_____.___
0064	COVERED CONFLUENCE/INVERT TRANSITION (SECTION R), STA. 47+04.000 TO STA. 49+73.000	1.00	LS	$___.__	$_____.___
0065	CHANNEL BOX CONDUIT (SECTION S), STA. 49+73.000 TO STA. 49+93.000 AND PORTION OF RAINBOW LATERAL STA. 9+99.100 to STA. 10+19.983	1.00	LS	$___.__	$_____.___
0066	CHANNEL BOX CONDUIT, STA. 49+93.000 TO STA. 50+37.018	1.00	LS	$___.__	$_____.___
0067	BOX CONDUIT @ RAINBOW BLVD., STA. 50+37.018 TO STA. 50+88.000	1.00	LS	$___.__	$_____.___
0068	TRANSITION STRUCTURE, STA. 50+88.000 TO STA. 51+38.000	1.00	LS	$___.__	$_____.___
0069	CHANNEL BOX CONDUIT, STA. 51+38.000 TO STA. 51+75.702	1.00	LS	$___.__	$_____.___
0070	RAINBOW LATERAL, STA. 10+19.983 TO STA. 11+38.403	1.00	LS	$___.__	$_____.___
0071	SIDE DRAIN, STA. 46+62.875 RT.	1.00	LS	$___.__	$_____.___
0072	SIDE DRAIN, STA. 48+67.994 RT.	1.00	LS	$___.__	$_____.___
0073	SIDE DRAIN, STA. 50+76.739 RT.	1.00	LS	$___.__	$_____.___
0074	SIDE DRAIN, STA. 50+84.247 LT.	1.00	LS	$___.__	$_____.___
0075	DROP INLET STRUCTURE FOR SIDE DRAIN, STA. 48+67.994 RT	1.00	LS	$___.__	$_____.___
0076	RAINBOW/DEWEY STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 50+76.739 RT	1.00	LS	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0077	RAINBOW/DEWEY STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 50+84.247 LT	1.00	LS	$___.__	$_____.___
0078	ROAD DETOURS @ RAINBOW BLVD.	1.00	LS	$___.__	$_____.___
0079	MANHOLES FOR BOX CONDUITS, CULVERTS, AND LATERALS BETWEEN STA. 51+75.702 TO STA. 46+51.092	1.00	LS	$___.__	$_____.___
0080	STREET/SIGNAGE MODIFICATIONS, REDWOOD STREET	1.00	LS	$___.__	$_____.___
0081	CHAIN LINK FENCE, **STA. 51+75.702 TO STA. 45+14.894**	**220**	m	$___.__	$_____.___
0082	PIPE SAFETY RAILING, BETWEEN **STA. 46+52.000 TO STA. 45+14.894**	**150**	m	$___.__	$_____.___
0083	DEWEY STREET REMOVAL AND REPLACEMENT, STA. 51+75.702 TO STA. 50+59.000	1.00	LS	$___.__	$_____.___
0084	**0.300 M (12 INCH)** WATERLINE @ RAINBOW BOULEVARD	1.00	LS	$___.__	$_____.___
0085	DOUBLE SWING GATES, **STA. 51+75.702 TO STA. 45+14.894**	4	ea	$___.__	$_____.___
0086	SOIL STABILIZER, **STA. 51+75.702 TO STA. 45+14.894**	**27,300**	m^2	$___.__	$_____.___
0087	STATION MARKINGS, **STA. 51+75.702 TO STA. 45+14.894**	1.00	LS	$___.__	$_____.___
0088	LADDER SYSTEMS, **BETWEEN STA. 51+75.702 TO STA. 45+14.894**	1.00	LS	$___.__	$_____.___
0089	**GROUTED RIPRAP, BETWEEN STA. 51+75.702 TO STA. 45+14.894**	**1.00**	**LS**	**$___.__**	**$_____.___**

1.3 **Option Item No. 2 (Item 0090 through Item 0107)**

Item	Description	Quantity	Unit	Unit Price	Amount
0090	CLEAR SITE AND REMOVE OBSTRUCTIONS, BETWEEN STA. 70+34.000 TO STA. 69+80.000	1.00	LS	$___.__	$_____.___
0091	EXCAVATION, BETWEEN STA. 70+34.000 TO STA. 69+80.000	2,650	m^3	$___.__	$_____.___
0092	COMPACTED FILL, CHANNEL, BETWEEN STA. 70+34.000 TO STA. 69+80.000	1,285	m^3	$___.__	$_____.___
0093	CONCRETE, CHANNEL INVERT SLAB, BETWEEN STA. 70+20.372 TO STA. 69+80.000	85	m^3	$___.__	$_____.___
0094	CONCRETE, CHANNEL WALLS, BETWEEN STA. 70+20.372 TO STA. 69+80.000	90	m^3	$___.__	$_____.___
0095	REINFORCING STEEL, BETWEEN STA. 70+20.372 TO STA. 69+80.000	17	t	$___.__	$_____.___
0096	AGGREGATE BASE COURSE, BETWEEN STA. 70+34.000 TO STA. 69+80.000	56	t	$___.__	$_____.___
0097	ASPHALT CONCRETE PAVEMENT, BETWEEN STA. 70+34.000 TO STA. 69+80.000	36	t	$___.__	$_____.___
0098	WEEPHOLE SYSTEM, BETWEEN STA. 70+20.372 TO STA. 69+80.000	1.00	LS	$___.__	$_____.___
0099	CHAIN LINK FENCE, BETWEEN STA. 70+34.000 TO STA. 69+80.000	54	m	$___.__	$_____.___
0100	PIPE SAFETY RAILING, BETWEEN STA. 70+20.000 TO STA. 70+21.000	4	m	$___.__	$_____.___

Item	Description	Quantity	Unit	Unit Price	Amount
0101	DOUBLE SWING GATES, BETWEEN STA. 70+34.000 TO STA. 69+80.000	4	ea	$___.__	$_____.___
0102	SOIL STABILIZER, BETWEEN STA. 70+34.000 TO STA. 69+80.000	1,650	m^2	$___.__	$_____.___
0103	STATION MARKINGS, BETWEEN STA. 70+34.000 TO STA. 69+80.000	1.00	LS	$___.__	$_____.___
0104	BOX CONDUIT @ BUFFALO DRIVE, STA. 70+20.372 TO STA. 70+34.000	1.00	LS	$___.__	$_____.___
0105	GROUTED RIPRAP, BETWEEN STA. 70+20.372 TO STA. 69+80.000	1.00	LS	$___.__	$_____.___
0106	CABLE SAFETY RAILING, BETWEEN STA. 70+20.372 TO STA. 69+80.000	82	m	$___.__	$_____.___
0107	RESTRICTOR PLATE FOR FLAMINGO DETENTION BASIN OUTLET	1.00	LS	$___.__	$_____.___
	TOTAL ESTIMATED AMOUNT				$_____._____

Abbreviations:

m	=	meter
m^3	=	cubic meter
m^2	=	square meter
t	=	metric ton (1000 kilograms)
ea	=	each
LS	=	lump sum
HA	=	hectare

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1. All extensions of the unit prices shown will be subject to verification by the Government. In case of variation between the unit price and the extension, the unit price will be considered to be the bid.

2. If a modification to a bid based on unit prices is submitted which provides for a lump sum adjustment to the total estimated amount, the application of the lump sum adjustment to each unit price in the Price Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the Price Schedule.

3. Prices must be submitted on all individual items of the Price Schedule, otherwise the bid will be considered nonresponsive and will be rejected.

4. For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the Price Schedule as submitted by the bidder:

a. Obviously misplaced decimal points will be corrected;

b. In case of discrepancy between the unit price and the extended price, the unit price will govern;

c. Apparent errors in extensions of unit prices will be corrected;

d. Apparent errors in addition of lump sum and extended prices will be corrected.

5. For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends the bid to be evaluated on the basis of unit prices the totals arrived at by the resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

6. The lump sum "LS" line items in the Price Schedule are not "Estimated Quantity" line items and are not subject to the "Variation in Estimated Quantity" contract clause.

7. The Contract Clause 52.232-27, "Prompt Payment for Construction Contracts" requires that the name and address of the contractor official, to whom payment is to be sent, be the same as that in the contract or in a proper Notice of Assignment.

8. Principal Contracting Officer. The Contracting Officer who signs this contract will be the Principal Contracting Officer for this contract. However, any Contracting Officer assigned to the Los Angeles District, contracting within his authority, may take formal action on this contract when the Principal Contracting Officer is unavailable and the action needs to be taken.

9. Amounts and prices shall be indicated in either words or figures, NOT BOTH.

10. Payment of Electronic Funds Transfer (EFT) is the mandatory method of payment. The Contractors attention is directed to Contract Clause NO. 52.232-33 "Mandatory Information for Electronic Funds Transfer" located in Section 00800.

11. The bidder shall distribute his indirect costs (overhead, profit, bond, etc.,) over all items in the Price Schedule. The Government will review all submitted Price Schedules for any unbalancing of the items. Any submitted Price Schedule determined to be unbalanced may be considered nonresponsive and cause the bidder to be ineligible for contract award.

12. The bidder shall furnish all plant, labor, material, equipment, etc., necessary to perform all work in strict accordance with the terms and conditions set forth in the contract in include all attachments thereto.

13. Some quantities are ESTIMATED, the bidders prices MUST BE FIRM.

14. Bidder is cautioned to check his Price Schedule carefully prior to submission. If the Price Schedule contains unit prices, they should be round off to the second decimal point only NOT EXTENDED FUTHER.

15. Contractor is required to fill in Cage code (Reference Section 00600, entitled "Required Central Contractor Registration" Mar 1998) and DUNS Number (Reference Section 00600, entitled, "Data Universal Numbering System (DUNS) Number" Jun1999) in Block No. 15 on Standard Form 1442, Name and Address Block (Cage Code under Code and DUNS No. under Facility Code respectively).

16. The Government contemplates award on one contract to the responsive, responsible bidder who submits the low bid for the total of all the items in the Price Schedule.

17. Bidders are to submit prices on all line items in the Bid Schedule. The Government contemplates award of one contract to the responsive, responsible bidder who submits the lowest bid for the Base Bid and Optional Bid Items. See Section 00100, Clause 52.217-5, entitled, "Evaluation of Options". Any bidder who submits a bid without all line items for both Base Bid and Optional Bid Items filled out comprehensively and correctly will be deemed nonresponsive and their bid will be rejected. Basis of Bid shall be the entire work complete in accordance with the drawings and specifications for Base Bid Items, and including the work indicated or specified to be provided under any Option Item.

18. Option Item No. 1 may be executed within 270 calendar days after Notice To Proceed of Base Bid Items by the Contracting Officer. A firm fixed bid price is required for each option. No provision is made for enomomic price adjustment.

19. Option Item No. 2 may be executed within 400 calendar days after Notice To Proceed of Base Bid Items by the Contracting Officer. A firm fixed bid price is required for each option. No provision is made for enomomic price adjustment.

20. Please refer to Section 00100, Submission of Bids for special instructions for Hand-Carried Bids.

CERTIFICATE OF CORPORATE PRINCIPAL

1) IF THE OFFEROR IS A JOINT VENTURE, COMPLETE THE FOLLOWING:

(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)

2) IF THE OFFEROR IS PARTNERSHIP, LIST FULL NAME OF ALL PARTNERS:

(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)

3) IF THE OFFEROR IS A CORPORATION, THE FOLLOWING CERTIFICATION SHOULD BE COMPLETED:

CERTIFICATION AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the corporation named as principal in the

within contract; that _____, who signed the said contract on behalf of the principal, was the

_____ of the corporation; that I know his signature and that his signature is genuine; and that said contract was duly signed, sealed and attested for in behalf of said corporation by authority of its governing body.

_____
CORPORATE PRINCIPAL

CORPORATE SEAL

_____
SECRETARY

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

Section 00800 - Special Contract Requirements

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***DENOTES CHANGE**

52.0001-4001 CONTRACT ADMINISTRATION DATA

The Contract Administration Office for this contract subsequent to award is:

Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

ATTN: Sandy Hall

Telephone No: 213/452-3243

Payment will be made by:

USACE Finance Center
ATTN: CEFC-AO-P
5270 Integrity Drive
Millington, TN 38054-5005

Submit Invoices to:

Refer to Block No. 26 of the Standard Form 1442, Solicitation, Offer and Award, which will be completed at time of contract award.

***52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)**

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than the number of calendar days after the date of receipt of Notice to Proceed set forth in the schedule below:

Item of Work	Commencement Time in Calendar Days After Receipt of Notice to Proceed	Completion Time in Calendar Days After Receipt of Notice to Proceed
BASE BID Line Item No's. 0001 thru 0051	**10**	**540**

Item of Work	Commencement Time in Calendar Days After Receipt of Notice to Proceed	Completion Time in Calendar Days After Receipt of Notice to Proceed
OPTION NO. 1 Line Item No's. 0052 thru 0089	**10**	**270**

This Option may be exercised any time up to 270 calendar days after Receipt of Notice to Proceed of Base Bid.

OPTION NO. 2 Line Item No's 0090 thru 0107	**10**	**140**

This Option may be excercised any time up to 400 calendar days after Receipt of Notice to Proceed of Base Bid.

* (End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of $1,350.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received

by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
13.9%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Las Vegas, Nevada.
(End of provision)

52.228-12 Prospective Subcontractor Requests for Bonds. (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

(End of clause)

52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

(a) “Irrevocable letter of credit” (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document

other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of less than $25 million in the past year, ILCs over $5 million must be confirmed by another acceptable financial institution that had letter of credit business of less than $25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

_____

[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date _____

IRREVOCABLE LETTER OF CREDIT NO. _____

Account party's name _____

Account party's address _____

For Solicitation No. _____(for reference only)

TO: [U.S. Government agency]

[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States $_____. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as

described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

_____
[Confirming Financial Institution's Letterhead or Name and Address]

(Date) _____

Our Letter of Credit Advice Number _____

Beneficiary: _____ [U.S. Government agency]

Issuing Financial Institution: _____

Issuing Financial Institution's LC No.: _____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ [name of issuing financial institution] for drawings of up to United States dollars _____/U.S. $_____ and expiring with our close of business on _____ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

_____

[City, State]

(Date) _____

[Name and address of financial institution]

Pay to the order of _____ [Beneficiary Agency] _____ the sum of United States $_____. This draft is drawn under Irrevocable Letter of Credit No. _____.

_____

[Beneficiary Agency]

By: _____

(End of clause)

52.228-15 Performance and Payment Bonds--Construction (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)

EFARS 52-231-5000

(a) Allowable costs for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region VII. Working conditions shall be considered to be average for determining equipment rates using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

(b) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

(c) When actual equipment costs are proposed and the total amount of the pricing action is over $25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the contractor grants to the contracting officer or an authorizing representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the contractor shall certify that the equipment costs of pricing data submitted are accurate, complete and current.

(End of clause)

52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER—CENTRAL CONTRACTOR REGISTRATION (MAY 1999)

(a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term “EFT” refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either--

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Contractor EFT arrangements. If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(g) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(j) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of Clause)

***52.232-4001 CONTINUING CONTRACTS (ALTERNATE) (MAR 1995) EFARS 52-232-5002**

(a) **Funds are not available at the inception of this contract to cover the entire contract price. The sum of $50,000.00 has been reserved for this contract and is available for payment to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal**

years from which additional funds, together with funds provided by one or more non-federal project sponsors will be reserved for this contract. The liability of the United States for payment beyond the funds reserved for this contract is contingent on the reservation of additional funds.

(b) Failure to make payment in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (e) and (h) below.

(c) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer will promptly notify the contractor of any additional funds reserved for the contract by issuing and administrative modification to the contract.

(d) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and of additional funds which will be needed to meet payments due or to become due under this contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(e) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. If and when sufficient additional funds are reserved, the contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of this contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat 97, as in effect on the first day of the delay in such payment.

(f) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under a "Suspension of Work" or similar clause or in any other manner under this contract.

(g) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(h) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be at no cost to the Government, except that, to the extent that additional funds to make payment therefore are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(i) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under this contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

(j) The term "Reservation" means monies that have been set aside and made available for payments under this contract.

(End of clause)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 35% percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by Core Borings and Test Borings.

(b) Weather conditions - the contractor shall satisfy himself as to the hazards likely to arise from weather conditions.

(c) Transportation facilities - the contractor shall make his own investigation of the conditions of existing public and private roads and clearances, restrictions, bridge load limits and other limitations affecting transportation and ingress and egress at the site of work. It shall be the contractor's responsibility to construct and maintain, at the contractor's expense, any haul roads required for construction operations.

(d) N/A.

(End of clause)

***52.236-16 QUANTITY SURVEYS (APR 1984) - ALTERNATE I (APR 1984)**

(a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The

Contractor shall retain copies of all such material furnished to the Contracting Officer.

(End of clause)

52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by," or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not

relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

(End of clause)

52.236-5000 PLANT AND MATERIAL REMOVAL AFTER CONTRACT TERMINATION (MAR 1995)--EFARS

Should this contract be terminated as provided in clause 52.232-5001 because of the failure of Congress to provide additional funds for its completion, the contractor may be permitted to remove plant and material on which payments for preparatory work have been made, subject to an equitable deduction from the amounts due the contractor to reimburse the United States for the unabsorbed value of such plant and material.

(End of clause)

BASIS FOR SETTLEMENT OF PROPOSALS EFARS 52.249-5000

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total costs basis, the following principals will be applied to determine allowable
equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable and unallowable expenses will be used to determine equipment operating expenses. [3]

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs age normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recover through the indirect expense
rate.

(End of Statement)

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

Title File Drawing No.

SEE DRAWING LIST
(End of clause)

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GENERAL REQUIREMENTS

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SECTION 01200

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F 1667	(1995) Driven Fasteners: Nails, Spikes, and Staples

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1993) Square and Hex Nuts (Inch Series)

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 20	(1994; Addenda Jan. 1997) American Softwood Lumbar Standards

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1	(1996) Safety and Health Requirements Manual
COE EM 1110-1-1003	(01 Aug 96) NAVSTAR Global Positioning System Survey
COE EM 1110-1-1005	(31 Aug 94) Topographic Surveying

U.S. DEPARTMENT OF COMMERCE (DOC)

DOC PS 1	(1996) Voluntary Product Standard - Construction and Industrial Plywood

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

DOT MUTCD Part 6	(2000) Manual on Uniform Traffic Control Devices for Streets and Highways

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-2246	(Rev B) Paint, Latex
CID A-A-2336	(Rev A) Primer Coating (Alkyd, Exterior Wood, White and Tints)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Topographic Surveyor; G, RE.

The Topographic Surveyor firm selected by the Contractor must be approved by the Contracting Officer prior to performing surveys for this contract.

SD-11 Closeout Submittals

3 full size sets of blueline prints marked up to depict as-built conditions.

Not later than two weeks after acceptance of the project by the Government, the Contractor shall deliver to the Contracting Officer 3 full size sets of blueline prints marked up to depict as-built conditions. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the drawings to the Contracting Officer within ten (10) calendar days.

1.3 PROJECT FACILITIES

The Contractor shall construct and/or erect the following project facilities as soon as possible and not less than 15 calendar days after notice to proceed.

1.3.1 Construction Signs

The signs shall include the following:

a. Project Signs: One Project Sign at location designated by the Contracting Officer.

b. Warning Signs: Facing approaching traffic on all haul roads crossing under overhead power transmission lines.

c. Hard Hat Signs: Ten hard hat signs at locations directed.

1.3.2 Bulletin Board

Bulletin board shall be erected at the Contractor's office.

1.3.3 Sanitary Facilities

Suitable sanitary facilities shall be provided and maintained by the Contractor.

PART 2 PRODUCTS

2.1 CONSTRUCTION SIGNS

2.1.1 Materials

2.1.1.1 Lumber

NIST PS 20, and shall be seasoned Douglas Fir, S4S, Grade D or better except that posts, braces and spacers shall be construction Grade (WCLB).

2.1.1.2 Plywood

DOC PS 1, grade A-C, Group 1, exterior type.

2.1.1.3 Bolts, Nuts and Nails

Bolts shall conform to ASME B18.2.1, nuts shall conform to ASME B18.2.2, and nails shall conform to ASTM F 1667.

2.1.1.4 Paints and Oils

Paints shall conform to CID A-A-2336 for primer and CID A-A-2246 for finish paint and lettering.

PART 3 EXECUTION

3.1 CONSTRUCTION OF SIGNS

3.1.1 Project and Hard Hat Signs

Constructed as detailed in Figures 1, 1A, 2, 3 and Safety Signs. Decals signs will be furnished by the Contracting Officer.

3.1.2 Warning Signs

Constructed of plywood not less than 1/2 inch thick and shall be securely bolted to the supports with the bottom of the sign face 3 feet above the ground. The sign face shall be 24 in. x 48 in., all letters shall be 4 in. in height, and the wording shall be: "WARNING: OVERHEAD TRANSMISSION LINES."

3.2 PAINTING SIGNS

All exposed surfaces and edges of plywood shall be given one coat of linseed oil and be wiped prior to applying primer. All exposed surfaces of signs and supports shall be given one coat of primer and 2 finish coats of

white paint. Except as otherwise indicated, lettering on all signs shall be black and sized as indicated.

3.3 PROJECT ENGINEERS'S OFFICE EQUIPMENT

Contractor shall provide computer software (3.5" floppy disc size) to the Contracting Officer for the type of scheduling system to be used and quantity/fill programs for tracking or estimating bid quantities during construction. Scheduling software must be capable of downloading completely to the COE Standard Data Exchange Format. The Contractor shall utilize a hand held radio system for communication between the Contractor's quality control representative and the Government's quality assurance representative. Radio equipment for the Governments use shall include a hand held radio, two batteries and one charger. The Contractor shall provide Government personnel with the following equipment for the duration of the contract: 1 Cellular telephone with voice mail, 2 nickel cadmium batteries, 1 desk top charger, 1 travel charger, and 400 minutes of air time per month or portion thereof.

3.4 BULLETIN BOARD

A weatherproof bulletin board, approximately 36 inches wide and 30 inches high, with hinged glass door shall be provided adjacent to or mounted on the Contractor's project office. If adjacent to the office, the bulletin board shall be securely mounted on no less than 2 posts. Bulletin board and posts shall be painted or have other approved factory finish. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and such other items required to be posted.

3.5 MAINTENANCE AND DISPOSAL OF PROJECT FACILITIES

The Contractor shall maintain the project facilities in good condition throughout the life of the project. Upon completion of work under this contract, the facilities covered under this section will remain the property of the Contractor and shall be removed from the site at his expense.

3.6 UNSATISFACTORY AND SCRAP MATERIAL

Materials characterized as unsatisfactory soil in accordance with Section 02300 EARTHWORK and materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap shall become the property of the Contractor and be removed from the site of work. The Contractor by signing this contract hereby acknowledges that he made due allowance for value, if any, of such scrap in the contract price.

3.7 ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION

Should the Contractor or any of his employees in the performance of this contract find or uncover any archaeological remains, he shall notify the Project Engineer immediately. Such notifications will be a brief statement in writing giving the location and nature of the findings. Should the discovery site require archaeological studies resulting in delays and/or

additional work, the Contractor will be compensated by an equitable adjustment under the CONTRACT CLAUSES of the contract.

3.8 PROTECTION OF EXISTING WORK

Before beginning any cutting or removal work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to such work to remain in place, to be reused, or to remain the property of the Government, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this contract.

3.9 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

3.9.1 General

The approximate location of all railroads, pipe lines, power and communication lines, and other utilities known to exist within the limits of the work are indicated on the drawings. The sizes, locations, and names of owners of such utilities are given from available information, but their accuracy is not guaranteed. Except as otherwise indicated on the drawings, all existing utilities will be left in place and the Contractor shall conduct his operations in such a manner that the utilities will be protected from damage at all times, or arrangements shall be made by the Contractor for their relocation at the Contractor's own expense. The Contractor shall be responsible for any damage to utilities known to exist and shall reimburse the owners for such damage caused by his operations.

3.9.2 Relocation or Removal

Utilities to be relocated or removed not as part of this contract are designated "To be Relocated by Others" or "To be Removed by Others", respectively. Utilities shown on the plans and not so designated will be left in place and be subject to the provisions of the CONTRACT CLAUSE: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS. The Contractor may make arrangements with the owner for the temporary relocation and restoration of utilities not designated to be relocated, or for additional work in excess of the work needed to relocate utilities designated for relocation at no additional cost to the Government.

3.9.3 Utilities Not Shown

If the Contractor encounters, within the construction limits of the entire project, utilities not shown on the plans and not visible as of the date of this contract and if such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer in writing to enable a determination by the Contracting Officer as to the necessity

for removal or relocation. If such utilities are left in place, removed or relocated, as directed by the Contracting Officer, the Contractor shall be entitled to an equitable adjustment for any additional work or delay.

3.9.4 Coordination

The Contractor shall consult and cooperate with the owner of utilities that are to be relocated or removed by others to establish a mutual performance schedule and to enable coordination of such work with the construction work. These consultations shall be held as soon as possible after award of the contract or sufficiently in advance of anticipated interference with construction operations to provide required time for the removal or relocation of affected utilities.

3.9.5 Notices

3.9.5.1 Utilities To be Relocated or Protected

The Contractor shall notify the Contracting Officer, in writing, 14 calendar days prior to starting work on any utility to be relocated or protected. On each relocation, notification shall include dates on which the Contractor plans excavation, by-pass work, removal work and/or installation work, as applicable.

3.9.5.2 Existing Bench Marks and R/W Markers

The Contractor shall notify the Contracting Officer, in writing, 7 days in advance of the time he proposes to remove any bench mark or right-of-way marker.

3.9.5.3 Disposal Site

Excess Satisfactory excavated materials not utilized as part of the construction shall be **crushed** or processed to maximum particle size of 3/4 of lift thickness, hauled, placed, and compacted in the **fill area** per lines and grades shown on the drawing **GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 (drawing sheet C27)**. Unsatisfactory soils and materials designated as scrap shall be removed from project site and disposed according to paragraph UNSATISFACTORY AND SCRAP MATERIAL of this section. The Contractor shall indicate the approximate quantities of material he proposes to place in disposal site. In addition to the above requirements, the Contractor shall notify the Contracting Officer 24 hours in advance of the time he proposes to start operations in the disposal area, and 48 hours in advance of any work which he proposes to do in the disposal area on Saturday, Sunday or legal holidays.

3.9.5.4 Spill Reporting

The Contractor shall notify the Contracting Officer immediately after any spill, regardless of quantity, including all personnel exposures. The Contractor shall submit a written notification not later than 7 calendar days after the initial notification. The written notification shall include the following:

a. Item spilled, leaked or releases in an unauthorized manner (Identification, Quantity and Manifest Numbers).

b. Whether the amount spilled, leaked or released in an unauthorized manner is EPA reportable and, if reported, a copy of the report.

c. Exact location of the spill, leak or unauthorized release.

d. Nature of exposure to personnel.

e. Containment procedures initiated.

f. Anticipated cleanup and disposal procedure.

g. Disposal location of spill, leak or unauthorized release residue.

3.9.5.5 Environmental Assessment Requirement

In order to satisfy the Environmental Assessment for this project, the Contracting Officer is required to have a qualified biologist on site at all times while clearing and grubbing operations are in progress. The biologist will be provided by the government. The Contractor shall notify the Contracting Officer 14 calendar days prior to the start of clearing and grubbing activities so that a biological monitor shall be required to walk immediately in front of the Contractor's clearing and grubbing equipment to survey for the threatened desert tortoise. For scheduling purposes, the Contractor shall coordinate and complete all clearing and grubbing activities within one-four workday period.

3.9.6 Restrictions

3.9.6.1 Representatives of Other Agencies

Personnel representing owners and agencies may be present for various portions of the work. However, the Contractor will be responsible only to the Contracting Officer.

3.9.6.2 Traffic Control Plan

The Contractor shall develop a Traffic Control Plan and obtain an approval from the Clark County Department of Public Works prior to construction. The plan shall include vehicular detour plans, details of truck haul routes, details of roadway restriping and signage for vehicular circulation, and parking details.

3.9.6.3 Existing Roads

The work shall be planned in such a manner that traffic on the existing roads outside actual construction areas and through the construction area shall be maintained at all times. The work area shall be examined carefully relative to the order and scope of work to be performed, with respect to the limiting provisions of the plans and specifications. The construction schedule shall be prepared giving full consideration to not impacting and maintaining traffic on existing roads outside and through the

construction area. Additional work on the existing roads may be done by others during the life of this contract.

3.9.6.4 Access and Haul Roads

Plans shall be submitted for approval for all proposed access and haul roads, whether within or outside the limits of the construction area, at least 15 calendar days prior to construction of such roads. The plans shall indicate width of road, direction of traffic, road markings, type of guardrail, curves, grades, runouts, and other information in sufficient detail for studying safety of the proposed roads. Haul roads shall be proposed so that use of existing residential streets and roads are minimized.

3.9.6.5 Public and Private Access Roads

When it is necessary for heavy equipment to operate on or to cross project roads or arterial roads, flaggers, signs, lights and/or other necessary safeguards shall be furnished to safely control and direct the flow of traffic. When it is necessary to operate on existing roads outside the construction area, all necessary permits shall be obtained from the appropriate private or public authority. Work shall be conducted in such manner so as to obstruct and inconvenience traffic on existing roads outside the construction limits as little as possible. Spillage of earth, dusty materials, boulders, and mud on project roads or other road will not be permitted. If spillage cannot be prevented, the spillage shall be immediately removed and such areas shall be kept clear throughout the workday. At the conclusion of each workday, such traveled areas shall be cleared of spillage, boulders, and mud.

3.9.6.6 Maintenance of Roads

All haul and access roads, within the construction area, including the borrow areas, shall be maintained to provide vehicular access for the Government's vehicles and the Contractor's vehicles and equipment. Road maintenance shall include rock/mud slides, washouts, and any incident which would restrict vehicular/equipment access. Prior to any alterations of any road alignment, the Contractor shall receive an approval from the Contracting Officer. Road maintenance and alterations shall be performed by the Contractor at no additional cost to the Government.

3.9.6.7 Traffic Safety

In accordance with CONTRACT CLAUSE: ACCIDENT PREVENTION, signs, barricades, and warning devices shall be provided, installed, and maintained as are required for protection of vehicular traffic at any location where operations interfere with public roads. Signs, barricades, lights, and signals, shall be in conformance with DOT MUTCD Part 6.

3.9.6.8 Rock and Gravel

Rock and gravel for use on haul roads and other facilities may be obtained from any source with the excavation limits or stockpiles within the project boundaries not designated for other use. The use of any such source shall

be subject to approval by the Contracting Officer.

3.9.6.9 Cooperation with Others

In addition to CONTRACT CLAUSE: OTHER CONTRACTS, agreements shall be made for cooperative use and maintenance of project road directly between the Contractors concerned and shall be subject to approval by the Contracting Officer. No maintenance shall be charged for its use of the roads. During the life of this contract, the Contractor is advised that the activities of other contractors will require access to portions of the Project Limits. These activities are listed at the end of this section under, SPECIAL CONSTRUCTION REQUIREMENTS. The Contractor shall coordinate his activities and cooperate with other contractors as to not delay or interfere with their work.

3.9.6.10 Temporary Culverts

Temporary culverts shall be provided as required for road drainage. Temporary culverts shall be corrugated metal pipe of adequate diameter. Exact locations of the temporary culverts shall be subject to approval by the Contracting Officer.

a. All culverts within the construction area, including the borrow areas, shall be maintained to provide unrestricted flow through the culverts. Culvert maintenance shall include debris cleaning, repair of failures, and extension of culverts due to road alterations. Culvert maintenance shall be performed by the Contractor at no additional cost to the Government.

3.9.7 Working Hours

The Contractor shall restrict all construction activities to the following schedule:

Monday thru Friday	6:30 a.m. to 7:00 p.m.
Saturday	8:00 a.m. to 7:00 p.m.

No work will be permitted on Sundays or Federal Holidays without the prior written approval from the Contracting Officer.

3.9.8 Construction Water

There are no known developed sources for water at or in the immediate vicinity of the project site. The Contractor shall be responsible for obtaining water for construction purposes at no additional cost to the Government.

3.9.9 Lighting

The Contractor shall provide a minimum of 5 foot-candle lighting intensity for all construction areas during the contract performance period.

3.9.10 Identification of Vehicles

All the Contractor's vehicles shall display suitable permanent identification.

3.9.11 Construction Method Observation

Any construction method, plant, or piece of equipment used on this contract shall not be considered proprietary, and can be inspected or photographed at any time by the Government, regulatory agencies, or any group approved by the Government.

3.9.12 Contractor's Equipment

The planned method of transportation and operation of cranes and other heavy equipment to be used in the performance of this contract shall be submitted for approval by the Contracting Officer. The plan shall include the type, size, loadings of equipment, the proposed transportation routes, and work areas to be used on the project.

3.10 PUBLIC SAFETY

Attention is directed to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES. The Contractor shall provide temporary fencing, barricades, and/or guards, as required, to provide protection in the interest of public safety. Whenever the contractor's operations create a condition hazardous to the public, he shall furnish at his own expense and without cost to the Government, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect, or maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents and avoid damage or injury to the public. Flagmen and guards, while on duty and assigned to give warning and safety devices shall conform to applicable city, county, and state requirements. Should the Contractor appear to be neglectful or negligent in furnishing adequate warning and protection measures, the Contracting Officer may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and installed by the Contractor without additional cost to the Government. Should the Contracting Officer point out the inadequacy of warning and protective measures, such action of the Contracting Officer shall not relieve the Contractor from any responsibility for public safety or abrogate his obligation to furnish and pay for those devices. The installation of any general illumination shall not relieve the Contractor of his responsibility for furnishing and maintaining any protective facility.

3.11 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) STANDARDS

The OCCUPATIONAL SAFETY and HEALTH ACT (OSHA) STANDARDS for CONSTRUCTION (Title 29, Code of Federal Regulations Part 1926 as revised from time to time) and the Corps of Engineers General Safety and Health Requirements Manual, COE EM 385-1-1, are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

3.11.1 Accident Reporting

In accordance with COE EM 385-1-1, the Contractor shall submit a written summary of worker's compensation claims which have been filled by worker's in connection with work on the project. The summary shall be submitted at the time when the work is approximately 50 percent complete and at project completion. The summary shall include all subcontractors. The Contractor's and subcontractor's compensation insurance carrier shall certify that the summaries are "correct and true".

3.12 PERMITS

3.12.1 General

Reference is made to the article of the contract entitled "Permits and Responsibilities", which obligates the Contractor to obtain all required licenses and permits.

3.12.2 Air Pollution Permit (APP)

The Contractor shall obtain an APP from the Clark County Health Department. For further information, contact Ms. Cynthia Mikes at telephone number (702) 383-1276.

3.12.3 National Pollutant Discharge Elimination System (NPDES) Permit

The Contractor shall obtain a NPDES permit from the United States Environmental Protection Agency (USEPA) under the Nation Wide Permit (NWP) program, which requires that a Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and maintained on-site throughout the construction period. A copy of the plan will be submitted to the Contracting Officer. In accordance with the NWP, a minimum of two (2) days prior to the start of construction activities, the Contractor shall submit a Notice of Intent (NOI) with fees to the Nevada Division of USEPA. The NOI shall be submitted on the standard EPA Form 3510-6 (8-92), and copies shall be provided to the Contracting Officer. For further information, contact Mr. Robb Saunders at telephone number (702) 687-4670.

3.13 NOTICE OF PARTNERSHIP

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractors. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and intended to achieve completion within budget, on schedule, and in accordance with plans and specifications. This partnership would be bilateral in makeup, and participation will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by both parties and will be shared equally with no change in contract price. To implement this partnership initiative it is anticipated that within 60 days of Notice to Proceed the Contractor's on-site project manager and the Government's Resident Engineer would attend a two day partnership development seminar/team building workshop together with the Contractor's key on-site staff and key Government personnel. Follow-up workshop of 1 to 2 days duration would be held periodically throughout the duration of the contract as agreed to by the Contractor and Government.

3.14 AS-BUILT DRAWINGS

3.14.1 General

The Contractor shall furnish 3 full size sets of as-built blueline prints for use in preparation of as-built drawings by the Government. The as-built prints shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In event the Contractor accomplishes additional work which changes the as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submission. The prints shall show the following information, but not be limited thereto:

a. The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

b. The location and dimensions of any changes within the building or structure.

d. Correct grade or alignment of roads, structures, or utilities if any changes were made from contract plans.

e. Correct elevations if changes were made in site grading.

f. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

g. The topography and grades of all drainage installed or affected as a part of the project construction.

h. All changes or modifications which results from the final inspection.

3.14.2 Options

Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built drawings.

3.14.3 Submittal to Contracting Officer for review and approval

Not later than two weeks after acceptance of the project by the Government, the Contractor shall deliver to the Contracting Officer 3 full size sets of blueline prints marked up to depict as-built conditions. If upon review,

the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the drawings to the Contracting Officer within ten (10) calendar days.

3.15 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15, 31 OCT 89)

a. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS
Work Days Based on five (5) Day Work Week

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6	2	2	1	1	0	2	2	1	1	1	3

c. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in subparagraph b, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION).

3.16 REQUIRED INSURANCE

The Contractor shall procure and obtain during the entire period of his performance under this contract the following minimum insurance:

a. General Public Liability insurance for bodily injury and property damage with minimum limits of $1,000,000 combined single limit per occurrence and $1,000,000 annual aggregate for bodily injury to or death, personal injury and property damage.

b. Automobile Liability insurance for bodily injury and property damage with minimum limits of $1,000,000 combined single limit for each occurrence and $1,000,000 annual aggregate.

c. Either Workman's Compensation or Employer's Liability insurance with a minimum limit of $1,000,000.

In every case the insurance coverage shall amount to at least the limits stated above. However, where the Financial Responsibility Compulsory Insurance Law of the State in which the installation is located requires higher limits, the Automobile Liability Insurance Policy should provide coverage of at least those limits. County of Clark, a political subdivision of the state of Nevada, and Clark County Regional Flood Control District shall be named as additional insured parties and all policies issued in performance of work under this contract.

The Contractor does hereby agree to indemnify, defend, and save harmless Clark County and Regional Flood Control District from loss, damage, liability, costs, or expense to the proportionate extent caused by the Contractor, his employees, agents, or consultants and/or consultants arising out of its performance of this contract, including, but not limited to the negligent acts, errors, omissions, or intentional misconduct of the Contractor, its employees, agents or consultants and/or subconsultants in connection with this contract.

Contractor further does hereby agree, as a precaution to the performance of any work under this contract and as a precaution to any obligation of Clark County to make any payment under this contract, to provide Clark County with a certificate and/or a certificate issued by the State Industrial Insurance System (SIIS) in accordance with Nevada Revised Statute 616.280. Contractor agrees to maintain required workers compensation throughout the entire term of the contract. If Contractor does not maintain coverage throughout the entire term of the contract, Contractor agrees that Owner may, at any time the coverage is not maintained by Contractor, order the Contractor to stop work, assess liquidated damages as defined herein, suspend the contract, or terminate the contract. For each six month period this contract is in effect, Contractor agrees, prior to the expiration of the six month period, make another written request to SIIS for the provisions of a certificate and notice of lapse in or nonpayment of coverage. If Contractor does not make the request or does not provide the certificate before the expiration of the six month period, Contractor agrees that owner may order the Contractor to stop work, suspend the contract or terminate the contract.

3.17 SPECIAL CONSTRUCTION REQUIREMENTS

The Contractor shall restrict his operation and adapt his construction schedule to accomodate the following:

3.17.1 Project Limits

The Contractor's work, employee parking, operations, staging, equipment assembly and maintenance, and other on-site activities shall be restricted to actual areas of construction within the Project Limits. The Project Limits of the Upper Flamingo Diversion Channel are indicated on the drawings, and constitute the maximum limits of the construction area available for Contractor's operations. The Project Limits are generally defined by the Rigt-of-Way (ROW) and adjoining Temporary Construction Easements (TCE) as shown on the plans, unless designated otherwise (either in the plans, in these Specifications or by the Contracting Officer). The Contractor shall be solely responsible for obtaining agreements with and acquisition from adjacent land owners, when additional land or access points are required to supplement the Contractor's operations or staging needs. No appurtenances or other public access facilities (either temporary or permanent) shall be constructed beyond the Project Limits.

3.17.2 Order of Channel Construction

Any continuation of the Contractor's operations in and access to those areas following issuance of the Notice to Proceed for the adjacent contract shall be requested in writing, and shall include:

1. A detailed critical-path scheduling diagram of the activities proposed,

2. A projected date of completion, and

3. A proposed method of coordination between potentially conflicting contract operations.

This information shall be reviewed by the Contracting Officer and if deemed acceptable, shall be approved by the Contracting Officer otherwise interim completions and restrictions listed below shall remain in effect.

3.17.2.1 Storm Runoff

In consideration of the potential for high-volume storm runoff occurring during the period of time when existing runoff patterns are disrupted, but the channel is not yet in service, the order of construction needs to be set to avoid significant erosive damage to elements of the project and existing facilities downstream.

The Contractor shall make all practical efforts to:

1.stage the construction of the channel from downstream to upstream (east to west), and

2. avoid long delays between excavation of the channel (and disruption of existing runoff patterns) and construction of the cast-in-place elements of the channel.

3.17.2.2 Temporary Construction Easement Expiration

The north side channel Temporary Construction Easement (TCE) from Sta 44+71 to Sta 43+75 expires on **01 October 2003**. All work inside this TCE limit and outside the Channel Right of Way (ROW) shall be completed by that date to include final grading and soil stabilization.

3.17.3 DISPOSAL SITES

Excess satisfactory excavated natural material not utilized as part of the construction shall be hauled, placed and compacted in disposal site per lines and grades shown on the drawings. Materials characterized as unsatisfactory soil in accordance with Section 02300 EARTHWORK shall become the property of the Contractor and shall be removed from the project site.

Disposal of excavated materials and excess excavated materials shall occur in the general area as described herein, east of Rainbow. The Contractor may utilize the TEMPORARY DISPOSAL SITE identified on drawing WORK LIMITS (drawing sheet T4) for only stockpiling material. The disposal site east of Rainbow Blvd (between Sta. 49+20.000 through Sta 42+00.000) shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 (drawing sheet C27) shall not be fully available to the Contractor at the time of contract award. The disposal site east of Rainbow includes areas in both base bid and the option bid. The base bid area and the option bid area disposal sites east of Rainbow are separated by the parcel line which extends from the Upper Flamingo Diversion Channel south to Russell Road (at approx Sta 44+71). The base bid portion of the disposal site may be utilized immediately with the contract award/notice to proceed, however, fill shall not be placed wherein storm or other waters will create ponding across this parcel line. The remaining portion of the east of Rainbow Disposal Site (option bid item area upstream of the parcel line at Sta 44+71) shall not be utilized until and only if, the OPTION ITEM No. 1 award is made.

The TEMPORARY DISPOSAL SITE identified on drawing WORK LIMITS (drawing sheet T4) may be used at any time, however, this site is only for temporary stockpiling of material and final disposition of any excavated material will be either within the construction features or if identified as excess excavated materials shall be at the area identified on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 (drawing sheet C27). If the Contractor elects to temporarily store material at the TEMPORARY DISPOSAL SITE shown on drawing WORK LIMITS (drawing sheet T4) until the option bid items are awarded, no additional money shall be provided to re-load and haul this excavated material to either other features of the construction or to the east of Rainbow Disposal Site (between Sta. 49+20.000 to Sta. 42+00.000).

3.17.4 Dewey Drive Phasing

The Reinforced Box Channel (RCB) construction along Dewey Drive (Sta 51+75.702 to Sta 56+00.000) shall be conducted in phases so as to minimize disruptions to merchants and Durango High School (see Dwg **DURANGO HIGH SCHOOL AREA CONSTRUCTION PHASING PLAN (drawing sheet D15)**). The Durango High School Summertime Phase shall be from **01 June 2003** through **21 August**

2003 and shall be from Sta 54+30 to Sta 56+00. The Summertime Phase shall include asphalt replacement and the RCP piping for the side drain at Sta 55+03.050 Right. The Merchant Phase (Sta 51+75.702 to Sta 54+30) shall be constructed before or after the Summertime Phase is started/completed. In the event that the bid option items are awarded, the Merchant Phase shall not be constructed at the same time as the Rainbow Phase 1 which entends into Rainbow Blvd upstream to Sta 51+75.702 (see Dwg **PHASE 1 & 2 DETOUR AT RANBOW BOULEVARD PLAN (drawing sheet D16)**). The Contractor shall make temporary connections for utilities (street lighting, irrigation, etc.) between these phases of construction so as to ensure continual operation of the undisturbed/replaced utilities at all times. Replacement of merchants signage, parking, landscaping, block walls, etc., shall be completed with each phase of RCB construction to include Rainbow Phase 1. Consideration for pedestrian foot traffic along Rainbow shall be made given for both Rainbow Phase 1 and 2. The Summertime Phase includes the installation and the removal of the temporary asphalt access road from Russell Road to Dewey Drive through the Contractor Stagging area as identified on Dwg **ROAD CLOSURE DETOUR PLAN TIMBER CREEK STREET (drawing sheet D-22)**.

3.17.5 Material Processing

In the event that the Contractor chooses to utilize a crusher or mechanical screen to process oversized material from the excavation for use in fills, the crusher(s) or mechanical screen(s) shall be located only within the limits of the Contractors Stagging area as identified on Dwg **WORK LIMITS STA. 55+00.000 TO STA 39+00.000 (drawing sheet T5)**.

3.17.6 Tenaya Sewer

The sewer line at Tenaya shall be relocated so as not to disrupt service. Any temporary by pass sewers installed for the purposes of this sewer relocation work shall be coordinated with the Clark County Sanitation District, if approved. Sewer shall be maintained at all times so as not to disrupt service.

3.17.7 Russell Road Improvements

The Upper Flamingo Diversion Channel Contractor is notified that the Russell Road Improvements (by others) is schedule to commence in **April 2003**. Russell Road will be improved from Rainbow Blvd east along the haul route corridor identified on Dwg **WORK LIMITS STA. 55+00.000 TO STA 39+00.000 (drawing sheet T5)**. Hauling operations shall be coordinated with the Russell Road Improvements Contractor.

3.17.8 Outlet Structure/Restrictor Plate

The Outlet Structure/Restrictor Plate (**drawing sheet S16**) shall not be installed at the Flamingo Detention Basin outlet structure until storm waters can be safely released through the completed Upper Flamingo Diversion Channel. In the event that the **Option Item No. 1** (RCB through and east of Rainbow) are not awarded under this contract, the steel restrictor plate shall neither be fabricated nor installed by the Upper Flamingo Diversion Channel Contractor. Safe passage of water through the Upper Flamingo Diversion Channel shall include the installation of joint

sealant at all channel invert joints requiring same.

3.17.9 Buffalo Road and Tioga Way Phasing

Construction of the Buffalo Road and Tioga Way areas of the Upper Flamingo Diversion Channel shall be constructed in phases as described herein. The Buffalo Lateral (**Sta 10+76.563** to Sta 12+10.198) may be constructed at any time during this contract provided an overall satisfactory (and approved) channel construction joint plan that will demonstrate safe measures to be employed to protect new work from the various phasing restrictions described herein.

3.17.9.1 Tioga Way RCB

The Tioga Way RCB (Sta 68+14.537 to Sta 68+51.117) shall not be started until traffic has been safely detoured to and the new asphalt road completed **(see ROAD CLOSURE DETOUR PLAN TIOGA WAY (drawing sheet D-23))** over the upstream half of the Buffalo Road RCB. Detour signage shall be maintained through the completion of the Tioga Way RCB and road asphalt replacement.

3.17.9.2 Buffalo Road RCB Phase 1

The Buffalo Road RCB and Transition Structure shall be constructed in a minimum of two phases. Phase 1 shall include the upstream portion of the RCB and the new paved road over same. Phase one shall extend from **Sta. 70+34.000** (a minimum of 3.048 meters downstream of the 36" LVVWD water main) upstream through Sta. 71+55.214. The Phase 1 Buffalo RCB work shall also include a temporary grouted stone riprap transition structure from **Sta. 70+34.000** to Sta. 70+29.000 to temporarily transition storm waters through the channel invert elevation differences between new RCB and existing gabion/low flow channel. **This temporary grouted stone riprap transition structure will have a 0.610 meter thick invert throughtout the length of reach and width of the invert section and 0.610 meter thick walls throughout the length and height of this reach and will transition the new RCB walls and invert into the existing gabion walls and invert.**

3.17.9.3 Buffalo Road RCB/Open Channel Phase 2

The Buffalo Road RCB/Open Channel Phase 2 (Option Item No. 2) shall not be started until the downstream option (Option Item No. 1) RCB and open channel through and east of Rainbow is completed to the extent that storm waters can safely pass through this downstream reach as well as the remaining portions of the Upper Flamingo Diversion Channel. A separate notice to proceed shall be issued by the Contracting Officer for this Buffalo Road Phase 2 area. The Phase 2 Buffalo Road work shall include the removal of the temporary grouted stone riprap section installed under the Buffalo Road Phase 1 work, and construction of the remaining RCB (Sta. 70+34.000 to Sta. 70+20.372 and the open channel wall height transition section from Sta. 70+20.372 to Sta. 70+03.551 **and open channel section from 70+03.551 to Sta. 69+80.000**. All remaining portions of the contract required work through this Phase 2 area may also be completed at this time.

3.17.10 Existing and New Utility Lines

There are numerous existing and new utility lines that will interface with the Upper Flamingo Diversion Channel or its Side Drains/Laterals. The Upper Flamingo Contractor shall coordinate their work with these new and existing lines. Recognized interfaces include relocations, supporting in place and new service(s). The Upper Flamingo Contractor shall coordinate their channel work with these utility interfaces and allow the utility companies contractors and representatives reasonable access to the Upper Flamingo Channel TCE and ROW areas as required to complete their work. The Upper Flamingo Diversion Channel TCE and ROW limits are not intended to be reserved for the sole use by the Upper Flamingo Contractor.

3.17.10.1 Southwest Gas Utility Lines

Numerous areas of the Upper Flamingo Channel and Laterals cross or interface with existing Southwest Gas lines. As identified by the design, the Upper Flamingo Contractor shall support in place or coordinate relocations of these lines. Lines to be relocated shall be done by Southwest gas after the Upper Flamingo Diversion Contractor has completed mass excavation through the area where the utility is to be relocated. The Upper Flamingo Contractor shall expose and temporarily support/protect in place these utility lines until they are relocated by Southwest Gas. The Contractor shall allow Southwest Gas five (5) working days to relocate these lines after the mass excavation through these areas is completed, and proper notification coordination with Southwest Gas has been made.

3.17.10.2 Sprint Telephone/Cox Cable

Numerous areas of the Upper Flamingo Channel and Laterals cross or interface with existing Sprint/Cox Cable lines. As identified by the design, the Upper Flamingo Contractor shall support in place or coordinate relocations of these lines. Lines to be relocated shall be done by Sprint/Cox Cable after the Upper Flamingo Diversion Contractor has completed mass excavation through the area where the utility is to be relocated. The Upper Flamingo Contractor shall expose and temporarily support/protect in place these utility lines until they are relocated by Sprint/Cox Cable. The Contractor shall allow Sprint/Cox Cable seven (7) working days to relocate these lines after the mass excavation through these areas is completed, and proper notification coordination with Sprint/Cox Cable has been made. All existing conduits for Sprint/Cox Cable which are temporarily disturbed by the Flamingo Diversion Channel Contractor shall be reconnected, mandrelled and have the pull ropes re-installed by the Upper Flamingo Diversion Contractor. Relocations by the utility owner does not include those utilities identified by the Upper Flamingo design to be relocated or protected by the Upper Flamingo Channel Contractor.

3.17.10.3 Nevada Power

Numerous areas of the Upper Flamingo Channel and Laterals cross or interface (aerial and underground) with existing Nevada Power circuits/ductbanks. As identified by the design, the Upper Flamingo Contractor shall coordinate their construction with relocation or protection in place requirements for Nevada Power interfaces.

Circuits/Ductbanks to be relocated shall be done by Nevada Power as described herein. The Rainbow Blvd east and west ductbanks shall be relocated by Nevada Power by **01 January 2003**. The Tenaya Way relocation at Mesa Vista shall be completed by Nevada Power by **01 January 2003**. The Tioga Way relocation shall be completed by Nevada Power by **01 January 2003**. The existing aerial circuit at the Torrey Pines crossing shall be raised (with the possibility that another pole will be added) by **01 November 2002**. The Upper Flamingo Diversion Channel Contractor shall schedule all Upper Flamingo Channel work so that these utility areas may be worked around until the services are relocated by others.

3.17.11 Active Side Drains/Storm Flows

The Upper Flamingo Diversion Channel will be constructed in and through existing residential and commercial neighborhoods. As a result, the Upper Flamingo Contractor shall anticipate runoff into the channel and channel construction area(s) from both storm flows and nuisance flows (excessive irrigation). The Upper Flamingo Contractor shall complete the new channel work by providing protection from these water flows to include pumping out of excavations or channels that are not free draining due to the many phases of work for this contract. Water shall not be allowed to pond within a concrete channel section (invert, walls and or roof) that is not free draining. Pumped water shall comply with the requirements of the Contractors Storm Water Prevention Permit.

3.18 CONTRACTOR'S SURVEYS

3.18.1 Survey Data

Reference is made to SECTION 00800: SPECIAL CONTRACT REQUIREMENTS, QUANTITY SURVEYS, ALTERNATE I, FAR 52.236-16 which requires payments based on surveys. Progress payments will be based upon Contractor's surveys. The Contractor's survey shall provide full coverage of the entire area for which progress payment is being submitted.

It is further emphasized that survey data which does not meet all applicable requirements and quality assurance verifications will not constitute a valid request for payment.

Contractor's surveys shall be performed electronically (automated) and the data shall be provided and submitted to the Government on an electronic media (IBM compatible, ASCII format) in delimited files of easting, northing, and depth (x,y,z), where the depth is indicated as positive if recorded above mean sea level. The first lines of the data file will list the information as follows:

* Project Name: UPPER FLAMINGO DIVERSION CHANNEL; ENTIRE PROJECT SITE 2002 AND 2003
* Surveyor's Name and Company Name
* Area Surveyed
* Type of Survey and Date of Survey (i.e. Pre-construction, MM/DD/YR
* Vertical Datum
* Horizontal Datum

These first 6 lines will be preceded by an asterisk (*), which indicates a comment line.

For both the pre-construction and post construction surveys, three (3) copies of the survey plotted on paper will accompany the x,y,z data (electronic file) and all data shall be collected and plotted in metric units (meters).

3.18.2 Survey Data Standards

The Contractor's surveys for progress payment shall meet or exceed the survey standards listed in COE EM 1110-1-1005, Topographic Surveying for topographic surveys. Surveys shall be in the State Plane Coordinate System of 1983 - meters (SPCS 83), State of Nevada, and be performed by an independent survey contractor with at least three (3) years of experience in topographic surveying of land features and have either a current Land Surveyor's or a Professional Engineer's license, authorized to certify surveys in the State of Nevada. The Topographic Surveyor firm selected by the Contractor must be approved by the Contracting Officer prior to performing surveys for this contract.

3.18.3 Positioning System

It is required that surveys shall be conducted using an RTK or similar modern electronic surveying equipment using Differential Global Positioning System (DGPS) with positional accuracy equal to or exceeding the survey standards listed in COE EM 1110-1-1003 and COE EM 1110-1-1005.

3.18.4 Survey Firm Acceptance

For the Contracting Officer to approve the selected survey firm, the Contractor must provide documentation indicating that modern electronic surveying equipment will be used for the surveys to be performed as well as documentation verifying the experience of the operators using the equipment. Typical information that will be required, as a minimum, includes the name, model, and year of manufacture of the electronic equipment, and the manufacturer's stated accuracies, and capability of the equipment proposed for usage. The Contractor shall submit credentials/qualifications as evidence that qualified, experienced staff are available and will be used for the operation of the electronic positioning and surveying equipment.

3.18.5 Data Processing

The Contractor shall use a Data Processing System to map the survey data and calculate quantities. Reduced survey data shall then be imported into the Data Processing System where cross-sections are compared to fill templates and volume quantities are calculated. The software shall be capable of digital terrain modeling and shall produce, as a minimum, topographic survey sheets, cross section profiles, 3-dimensional area profiles, and quantity volume calculations using the Triangulated Irregular Network (TIN) method.

-- End of Section --

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11.1 Measurement.
11.2 Payment.

PART 12 WEEPHOLE SYSTEM, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+14.894 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0014).

PART 13 BOX CONDUIT @ TORREY PINES DRIVE, STA. 42+52.904 to STA. 42+95.578 (Bid Item 0015).

PART 14 CHANNEL BOX CONDUIT, STA. 51+75.702 to STA. 62+00.000 (Bid Item 0016).

PART 15 INVERT ACCESS RAMP, STA. 66+16.692 to STA. 66+80.000 (Bid Item 0017).

PART 16 BOX CONDUIT @ TIOGA WAY, STA. 68+14.537 to STA. 68+51.117 (Bid Item 0018).

PART 17 CONFLUENCE/INVERT TRANSITION FOR FLAMINGO CHANNEL, STA. 68+51.117 to STA. 69+53.335, AND A PORTION OF BUFFALO LATERAL, STA. 10+00.000 to STA. 10+76.563 (Bid Item 0019).

PART 18 BOX CONDUIT @ BUFFALO DRIVE, STA. 70+34.000 to STA. 70+58.784 (Bid Item 0020) (Note: Other portion of Box Conduit @ Buffalo Drive, Sta. 70+20.372 to Sta 70+34.000 is in the Option Item No. 2).

PART 19 TRAPEZOIDAL TO RECTANGULAR CHANNEL TRANSITION, STA. 70+95.214 to STA. 71+15.521 (Bid Item 0021).

PART 20 BUFFALO LATERAL, STA. 10+76.563 to STA. 12+10.198 (Bid Item 0022).

PART 21 SIDE DRAINS (Bid Items 0023, 0024, 0025, 0026, 0027, 0028, 0029).

PART 22 SLOTTED CHAMBER, STA. 42+62.879 RT (Bid Item 0030).

PART 23 21 FOOT CHANNEL (Bid Item 0031).

PART 24 INLET STRUCTURE, SINGLE RCP STA. 55+03.050 RT and INLET STRUCTURE, DOUBLE RCP STA. 56+23.050 LT AND RT (Bid Item 0032 and 0034).

PART 25 43 FOOT CHANNEL & TENAYA WAY ROAD MODIFICATIONS (Bid Item 0033).

PART 26 TIOGA STREET REMOVAL AND RECONSTRUCTION (Bid Item 0035).

PART 27 TENAYA/DIABLO STORM DRAIN SYSTEM FOR SIDE DRAIN, STA 58+21.761 RT (Bid Item 0036)

PART 28 TENAYA/ELDRIDGE STORM DRAIN SYSTEM FOR SIDE DRAIN, STA 61+30.000 RT (Bid Item 0037)

PART 29 MANHOLES FOR BOX CONDUITS, CULVERTS, AND LATERALS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 46+51.092 (Bid Item 0038).

PART 30 ACCESS ROAD @ DURANGO HIGH SCHOOL (Bid Item 0039).

PART 31 ROAD DETOURS @ BUFFALO/TIOGA (Bid Item 0040).

PART 32 CHAIN LINK FENCE, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0041).

32.1 Measurement.
32.2 Payment.

PART 33 PIPE SAFETY RAILING, EXCEPT BETWEEN STA. 46+52.000 TO STA. 45+14.894 AND BETWEEN STA. 70+20.000 TO STA. 70+21.000 (Bid Item 0042).

33.1 Measurement
33.2 Payment

PART 34 CABLE SAFETY RAILING, EXCEPT BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0043).

34.1 Measurement
34.2 Payment

PART 35 DOUBLE SWING GATES, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0044).

35.1 Measurement
35.2 Payment.

PART 36 SOIL STABILIZER, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0045).

36.1 Measurement.
36.2 Payment

PART 37 STATION MARKINGS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0046).

PART 38 AS-BUILT DRAWINGS (Bid Item 0047).

38.1 Measurement
38.2 Payment

PART 39 DEWEY STREET REMOVAL AND REPLACEMENT STA. 56+00.000 to STA. 51+75.702 (Bid Item 0048).

39.1 Dewey Street Road Closure and Detour Plan
39.2 Removal
39.3 Removal and Storage for Reinstallation
39.4 Protect In Place
39.5 Replacement Items
39.6 Restore, Replant, Install and Reinstall Items
39.7 STORAGE ONE Sign Removal, Storage and/or Temporary Reinstallation and Permanent Reinstallation

PART 40 0.250 M (10 INCH) SEWER @ TENAYA WAY (Bid Item 0049).

PART 41 0.300 M (12 INCH) WATERLINE @ BUFFALO DRIVE (Bid Item 0050).

PART 42 LADDER SYSTEMS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0051)

PART 43 CLEAR SITE AND REMOVE OBSTRUCTIONS, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0052).

PART 44 EXCAVATION, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0053).

44.1 Measurement.
44.2 Payment.
44.3 Unsatisfactory Soils
44.4 Excavation for Structures
44.5 Excavation for Utilities
44.6 Shoring

PART 45 COMPACTED FILL, STA. 51+75.702 TO STA. 45+14.894

45.1 Measurement.
45.2 Payment.
45.2.1 COMPACTED FILL, CHANNEL, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0054).
45.2.2 Fill for Structures.
45.2.3 Trenches.
45.2.4 Subgrade Preparation.

PART 46 CONCRETE, STA. 46+51.092 TO STA. 45+14.894.

46.1 Measurement.
46.2 Payment.
46.2.1 CONCRETE, CHANNEL INVERT SLAB, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0055).
46.2.2 CONCRETE, CHANNEL WALLS, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0056).

46.2.3 Concrete, Cut-off Wall.
46.2.4 Concrete, Transition

PART 47 REINFORCING STEEL, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0057).

47.1 Measurement.
47.2 Payment.

PART 48 AGGREGATE BASE COURSE, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0058).

48.1 Measurement.
48.2 Payment.

PART 49 ASPHALT CONCRETE PAVEMENT, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0059).

49.1 Measurement.
49.2 Payment.

PART 50 WEEPHOLE SYSTEM, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0060).

PART 51 INVERT ACCESS RAMP, STA. 45+14.894 to STA. 45+76.000 (Bid Item 0061).

PART 52 BOX CONDUIT @ REDWOOD STREET, STA. 46+51.092 to STA. 46+87.668 (Bid Item 0062).

PART 53 CHANNEL BOX CONDUIT, STA. 46+87.668 TO STA. 47+04.000 (Bid Item 0063).

PART 54 COVERED CONFLUENCE/INVERT TRANSITION (SECTION R), STA. 47+04.000 to STA. 49+73.000 (Bid Item 0064).

PART 55 CHANNEL BOX CONDUIT (SECTION S), STA. 49+73.000 to STA. 49+93.000 AND PORTION OF RAINBOW LATERAL, STA. 9+99.100 to STA. 10+19.983 (Bid Item 0065).

PART 56 CHANNEL BOX CONDUIT, STA. 49+93.000 to STA. 50+37.018 (Bid Item 0066).

PART 57 BOX CONDUIT @ RAINBOW BLVD., STA. 50+37.018 to STA. 50+88.000 (Bid Item 0067).

PART 58 TRANSITION STRUCTURE, STA. 50+88.000 to STA. 51+38.000 (Bid Item

0068).

PART 59 CHANNEL BOX CONDUIT, STA. 51+38.000 to 51+75.702 (Bid Item 0069).

PART 60 RAINBOW LATERAL, STA. 10+19.983 to STA. 11+38.403 (Bid Item 0070).

PART 61 SIDE DRAINS (Bid Items 0071, 0072, 0073, 0074).

PART 62 DROP INLET STRUCTURE FOR SIDE DRAIN, STA. 48+67.994 RT (Bid Item 0075).

PART 63 RAINBOW/DEWEY STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 50+76.739 RT (Bid Item 0076).

PART 64 RAINBOW/DEWEY STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 50+84.247 RT (Bid Item 0077).

PART 65 ROAD DETOURS @ RAINBOW BLVD (Bid Item 0078).

PART 66 MANHOLES FOR BOX CONDUITS, CULVERTS, AND LATERALS BETWEEN STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0079).

PART 67 STREET/SIGNAGE MODIFICATIONS, REDWOOD STREET (Bid Item 0080).

PART 68 CHAIN LINK FENCE, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0081).

68.1 Measurement.
68.2 Payment.

PART 69 PIPE SAFETY RAILING, BETWEEN STA. 46+52.000 TO STA. 45+14.894 (Bid Item 0082).

69.1 Measurement
69.2 Payment

PART 70 DEWEY STREET REMOVAL AND REPLACEMENT, STA. 51+75.702 TO STA. 50+59.000 (Bid Item 0083).

70.1 Removal
70.2 Removal and Storage for Reinstallation
70.3 Protect In Place
70.4 Replacement Items
70.5 Restore, Replant, Install and Reinstall Items

PART 71 0.300 M (12 INCH) WATERLINE @ RAINBOW BOULEVARD (Bid Item 0084)

PART 72 DOUBLE SWING GATES, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0085).

72.1 Measurement
72.2 Payment.

PART 73 SOIL STABILIZER, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0086).

73.1 Measurement.
73.2 Payment

PART 74 STATION MARKINGS, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0087).

PART 75 LADDER SYSTEMS, BETWEEN STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0088).

PART 76 GROUTED RIPRAP, BETWEEN STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0089)

76.1 Measurement.
76.2 Payment.

PART 77 CLEAR SITE AND REMOVE OBSTRUCTIONS, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0090).

PART 78 EXCAVATION, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0091).

78.1 Measurement.
78.2 Payment.
78.3 Unsatisfactory Soils
78.4 Excavation for Structures
78.5 Excavation for Utilities
78.6 Shoring

PART 79 COMPACTED FILL, BETWEEN STA. 70+34.000 TO STA. 69+80.000.

79.1 Measurement.
79.2 Payment.
79.2.1 COMPACTED FILL, CHANNEL, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0092).
79.2.2 Fill for Structures.
79.2.3 Trenches.
79.2.4 Subgrade Preparation.

PART 80 CONCRETE, BETWEEN STA. 70+20.372 TO STA. 69+80.000.

80.1 Measurement.
80.2 Payment.
80.2.1 CONCRETE, CHANNEL INVERT SLAB, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0093).
80.2.2 CONCRETE, CHANNEL WALLS, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0094).
80.2.3 Concrete, Cut-off Wall.
80.2.4 Concrete, Transition

PART 81 REINFORCING STEEL, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0095).

81.1 Measurement.
81.2 Payment.

PART 82 AGGREGATE BASE COURSE, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0096).

82.1 Measurement.
82.2 Payment.

PART 83 ASPHALT CONCRETE PAVEMENT, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0097).

83.1 Measurement.
83.2 Payment.

PART 84 WEEPHOLE SYSTEM, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0098).

PART 85 CHAIN LINK FENCE, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0099).

85.1 Measurement.
85.2 Payment.

PART 86 PIPE SAFETY RAILING, BETWEEN STA. 70+20.000 TO STA. 70+21.000 (Bid Item 0100).

86.1 Measurement
86.2 Payment

PART 87 DOUBLE SWING GATES, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0101).

87.1 Measurement
87.2 Payment.

PART 88 SOIL STABILIZER, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0102).

88.1 Measurement.

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 CONTRACT PRICE AND PAYMENT

The contract price and payment shall constitute full compensation as stated in the Contract Clause, CONTRACT PRICES - BIDDING SCHEDULES, for completion of the work. No separate payment will be made for any material or work necessary to complete the work that is not specifically mentioned, such materials and work shall be considered incidental to all bid items. As stated in Contract Clause, SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, the word "provided" shall be understood to mean "furnished and installed" when used in this section or elsewhere in the technical sections.

1.2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided. Some of the lump sum payment items reference drawings and plans that utilize english units of measurements.

1.3 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.4 OPTION ITEM No. 1 AND OPTION ITEM No. 2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided. **Option Item No. 1 includes channel construction work and all appurtenances between Station 51+75.702 to Station 45+14.894; Option Item No. 2 includes channel construction work and all appurtenances between Station 70+34.000 to Station 69+80.000 that may or may not be executed depending on acquisition of right-of-way grants.** Some of the option item bid lump sum payment items reference drawings and plans that utilize english units of measurements.

1.5 OPTION ITEM No. 1 AND OPTION ITEM No. 2 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items. **Option Item No. 1 includes channel construction work and all appurtenances between Station 51+75.702 to Station 45+14.894; Option Item No. 2 includes channel construction work and all appurtenances between Station 70+34.000 to Station 69+80.000 that may or may not be executed depending on acquisition of right-of-way grants.**

PART 2 **TRAFFIC CONTROL, ENTIRE PROJECT INCLUDING OPTION ITEM No. 1 AND OPTION ITEM No. 2** (Bid Item 0001)

Payment for Traffic Control, Entire Project Including Option Item No. 1 and Option Item No. 2 will be made at the applicable contract price, which payment shall constitute full compensation for traffic control including but not limited to earthwork and grading, construction and removal of temporary roadways; providing safety barriers; providing traffic warning and control signs and lighting; stripping; flag men as required.

PART 3 **DIVERSION AND CONTROL OF WATER, ENTIRE PROJECT INCLUDING OPTION ITEM No. 1 AND OPTION ITEM No. 2** (Bid Item 0002).

Payment for Diversion and Control of Water, Entire Project Including Option Item No. 1 and Option Item No. 2 will be made at the applicable contract price, which payment shall constitute full compensation for maintaining the work area in a dry condition.

PART 4 CLEAR SITE AND REMOVE OBSTRUCTIONS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+29.000** TO STA. 69+80.000 (Bid Item 0003).

Payment for Clear Site and Remove Obstructions, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+29.000 to Sta. 69+80.000 shall include all costs for clearing, removal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area. Except as otherwise specified, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Channel right-of-way and temporary construction easement; including removal of existing riprap rock, removal of existing grouted riprap rock as shown on the drawings; removal and salvage of existing concrete blocks and fence as shown on the drawings and storage of same as shown on the drawings; removal of existing concrete pavement and concrete curb and gutter and plantmix bituminous surface (pbs) as shown on the drawings; removal of existing gabions consisting of gabion cages, gabion hold downs and gabion rocks; **removal of existing low flow channels upstream of Sta. 70+29.000;** removal, protection, replacement or restoration of existing structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work, complete.

PART 5 EXCAVATION, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+29.000** TO STA. 69+80.000 (Bid Item 0004).

5.1 Measurement.

A survey of the site shall be made prior to commencement of work, and all measurements will be based on this survey without regard to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and the ground surfaces as indicated by the above mentioned survey. The quantity of directed excavation necessary for the removal of unsatisfactory foundation material as

specified shall be included in the measurement of the excavation where the unsuitable soils are encountered. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. The total quantity of excavated material for which payment will be made will be the theoretical quantity between the ground surface as determined by a survey and the grade and slope of the theoretical cross sections indicated. No allowance will be made for overdepth excavation or for the removal of any material outside the required slope lines. All excavation outside of excavation lines shown on the drawings will be considered as being for the convenience of the Contractor.

5.2 Payment.

Payment for **Excavation, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+29.000 To Sta. 69+80.000** will be made for costs associated with excavation for the channel at the applicable contract price, which payment shall constitute full compensation for excavating the channel, and other areas as indicated on the drawings, including shoring, rock removal, and cemented alluvium excavation; shaping and trimming of areas to receive concrete; including foundation preparation; crushing or otherwise processing, loading, stockpiling, hauling, and placing suitable materials for compacted fill; including stockpiling, crushing/processing, loading, hauling, placing excess satisfactory excavated materials at disposal site shown on drawings. Payment will not be included for excavation (including shoring) outside the excavation limits indicated on the drawings or staked in the field, and other excavation requirements for which separate payments are provided.

5.3 Unsatisfactory Soils

No separate payment will be made for the excavation, hauling, and disposal of unsatisfactory soils. When such excavation is directed, payment therefore will be included in the applicable contract price for the items of work under which the unsuitable soils are encountered. When there is no applicable contract item an adjustment will be made.

5.4 Excavation for Structures

No separate payment will be made for excavation for structures. All costs therefore shall be included in the applicable contract item to which the work applies.

5.5 Excavation for Utilities

No separate payment will be made for excavation for utilities. All costs therefore shall be included in the applicable contract item to which the work applies.

5.6 Shoring

When shoring is indicated or directed for items for which separate payment is made, payment will be included in the applicable contract price for the

items of work under which the shoring is placed.

PART 6 COMPACTED FILL, EXCEPT BETWEEN STA. 51+75.705 TO STA 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000.

6.1 Measurement.

Measurement for compacted fills will be made between the excavation and structure lines and the fill limit lines, or between the ground lines and fill lines, as indicated or staked in the field. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections.

6.2 Payment.

6.2.1 COMPACTED FILL, CHANNEL, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0005).

Payment for **Compacted Fill, Channel, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to Sta. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, **including at disposal site shown on drawing GRADING PLAN, STA. 49+20.000 TO 42+00.000,** and compacting the fill, complete. Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

6.2.2 **COMPACTED FILL, EXCESS SATISFACTORY EXCAVATED MATERIAL IN DISPOSAL SITE - STA. 49+20.000 TO STA. 42+00.000** (Bid Item 0006).

Payment for **Compacted Fill, Excess Satisfactory Material in Disposal Site - Sta. 49+20.000 to Sta. 42+00.000** will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, and compacting the fill, at disposal site(s) shown on the drawings, complete. Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

6.2.3 Fill for Structures.

No separate payment will be made for fill or backfill around structures. All such costs shall be included in the applicable contract prices for structure items to which the work applies.

6.2.4 Trenches.

No separate payment will be made for backfilling for utilities, side drains and confluences. All costs in connection therewith shall be included in the contract prices for items to which the work applies.

6.2.5 Subgrade Preparation.

No separate payment will be made for subgrade preparation and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

PART 7 CONCRETE, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000.

7.1 Measurement.

Measurement of concrete will be made on the basis of the actual volume, in **cubic meters**, of concrete within the pay lines of the concrete invert slab, walls, top slab, and slope protection as shown on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structures. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meter in cross section. Concrete placed in items of work other than those specifically mentioned above, and concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment.

7.2 Payment.

Payment for the concrete items will be made at the applicable contract prices for the various items of the schedule, which payments shall constitute full compensation for labor, materials (except reinforcing steel for which separate payment is provided), joint sealant, forming, furnishing concrete, placing concrete, finishing concrete, curing concrete, and for all equipment and tools to complete the concrete work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. No payment will be made for concrete, as such, which is placed in structures for which payment is made on a lump sum basis.

7.2.1 CONCRETE, CHANNEL INVERT SLAB, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0007).

Payment for **Concrete, Channel Invert Slab, Except Between Sta. 46+51.092 to Sta. 45+76.000 and Between Sta. 70+20.372 to STA. 69+80.000** will be made at the applicable contract price, which shall constitute full compensation for all concrete (including all necessary items described in Paragraph 7.2 above) placed for the invert slab of the channel, keys, starter walls, and cut-off walls, complete.

7.2.2 CONCRETE, CHANNEL WALLS, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0008).

Payment for **Concrete, Channel Walls, Except Between Sta. 46+51.092 to Sta. 45+76.000 and Between Sta. 70+20.372 to Sta. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph 7.2 above) placed above the starter walls in the vertical walls of the channel, the walls of the warped transition structures, including wall height transitions, complete.

7.2.3 Concrete, Channel Side Slope.

No separate payment will be made for concrete, channel side slope and all costs in connection therewith shall be included in the contract prices for immediate adjacent items to which the work applies..

7.2.4 Concrete, Cut-off Wall.

No separate payment will be made for concrete, cut-off walls and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

7.2.5 Concrete, Transition

Payment for concrete, transition and all costs in connection therewith shall be included in the contract prices for concrete, channel walls and concrete, channel invert slab or to the applicable contract price for which the work applies.

7.2.6 CONCRETE OVERFLOW STRUCTURES (Bid Item 0009).

Payment for **Concrete Overflow Structures** will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph 7.2 above) placed for the concrete overflow structure, including furnishing and placing reinforcing steel; furnishing and placing metal fences and metal gates where shown on the drawings (two locations), complete except earthwork.

PART 8 **GROUTED RIPRAP, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0010)**

8.1 Measurement.

Measurement of Grouted Riprap will be made on the basis of the actual volume, in cubic meters, of grouted riprap within the pay lines of the grouted riprap structure as shown on the drawings. Measurement of grouted riprap placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the grouted riprap structure. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meterin cross section. Grouted riprap placed in items of work other than those specifically mentioned above, and grouted riprap and grout and riprap wasted or used for the convenience of the Contractor will not be included in measurement for payment.

8.2 Payment.

Payment for Grouted Riprap, Except Between Sta. 51+75.702 to Sta. 45+14.894 **and Between Sta. 70+20.372 to Sta. 69+80.000** will be made at the applicable

contract unit price, which payment shall constitute full compensation for obtaining and placing the grouted riprap and grout; including temporary grouted riprap transition structure as identified in Section 01200 GENERAL REQUIREMENTS, paragraph BUFFALO ROAD RCB PHASE 1.

PART 9 REINFORCING STEEL, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+76.000 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0011).

9.1 Measurement.

Measurement of reinforcing steel in metric tonnes (1,000 kilograms) is limited to reinforcement in concrete structures paid for on a cubic meters basis. Measurement will be made of the lengths of bars actually placed in the completed work in accordance with the plans and specifications, approved bar schedules, or as directed. The measured lengths will converted to weights for the bar numbers listed by the unit weights per linear foot contained in ASTM A 615. Steel in laps indicated on the drawings, in the specifications, or required by the Contracting Officer will be included in measurement for payment. No measurement will be made for the additional steel in laps which are authorized for the convenience of the Contractor. No measurement will be made of steel supports or spacers. All costs for furnishing and installing supports and spacers shall be included in the various structures requiring the reinforcement.

9.2 Payment.

Payment for **Reinforcing Steel, Except Between Sta. 46+51.092 to Sta. 45+76.000 and Between Sta. 70+20.372 to Sta. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for furnishing and installing steel reinforcement, complete. No payment will be made for steel reinforcement which is placed in structures for which payment is made on a lump sum basis.

PART 10 AGGREGATE BASE COURSE, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0012).

10.1 Measurement.

Measurement of aggregate base course will be by the metric tonne (1,000 kilograms) of aggregate base course placed within the lines and grades indicated on the drawings.

10.2 Payment.

Payment for **Aggregate Base Course, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to Sta. 69+80.000** will be made at the applicable contract price which payment shall constitute full compensation for earthwork required for installation of aggregate base course, furnishing and placing the aggregate base course, complete, including subgrade preparation.

PART 11 ASPHALT CONCRETE PAVEMENT, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0013).

11.1 Measurement.

Measurement for asphalt concrete pavement will be by the metric tonne (1,000 kilograms) of asphalt concrete pavement placed within the lines and grades as indicated on the drawing.

11.2 Payment.

Payment for **Asphalt Concrete Pavement, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to Sta. 69+80.000** will be made at the applicable contract price which payment shall constitute full compensation for asphalt concrete pavement in place, complete including tack coat, prime coat and appurtenant work except for aggregate base course. No payment will be made for excessive thickness.

PART 12 WEEPHOLE SYSTEM, EXCEPT BETWEEN STA. 46+51.092 TO STA. 45+14.894 AND BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0014).

Payment for the **Weephole System, Except Between Sta. 46+51.092 to Sta. 45+14.894 and Between Sta. 70+20.372 to Sta. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for materials, and installation of the weephole system, complete including applicable earthwork, drain aggregate, geotextile, form openings and appurtenances, complete.

PART 13 BOX CONDUIT @ TORREY PINES DRIVE, STA. 42+52.904 to STA. 42+95.578 (Bid Item 0015).

Payment for Box Conduit @ Torrey Pines Drive Sta. 42+52.904 to Sta. 42+95.578 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls, and including maintaining existing traffic barriers on North side of channel at Torrey Pines Drive, and including extra traffic control devices that will be left in place after Contractor leaves site on South side of channel at Torrey Pines Drive, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 14 CHANNEL BOX CONDUIT, STA. 51+75.702 to STA. 62+00.000 (Bid Item 0016).

Payment for Channel Box Conduit, Sta. 51+75.702 to Sta. 62+00.000 will be made at the applicable contract price, which payment shall constitute full

compensation for the channel box conduit except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 15 INVERT ACCESS RAMP, STA. 66+16.692 to STA. 66+80.000 (Bid Item 0017).

Payment for Invert Access Ramp, Sta. 66+16.692 to Sta. 66+80.000 also includes the adjacent open channel from Sta. 66+16.692 to Sta. 66+80.000. Payment will be made at the applicable contract price, which payment shall constitute full compensation for the invert access ramp and open channel except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; including pipe access gate installed at top of access ramp to restrict vehicle access into channel invert and all appurtenances; and all incidentals, complete as shown on the drawings except for pipe safety hand rail, chain link fencing, and double swing gate.

PART 16 BOX CONDUIT @ TIOGA WAY, STA. 68+14.537 to STA. 68+51.117 (Bid Item 0018).

Payment for Box Conduit @ Tioga Way, Sta. 68+14.537 to Sta. 68+51.117 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 17 CONFLUENCE/INVERT TRANSITION FOR FLAMINGO CHANNEL, STA. 68+51.117 to STA. 69+53.335, AND A PORTION OF BUFFALO LATERAL, STA. 10+00.000 to STA. 10+76.563 (Bid Item 0019).

Payment for the Confluence/Invert Transition for Flamingo Channel, Sta. 68+51.117 to Sta. 69+53.335, and a Portion of Buffalo Lateral, Sta. 10+00.000 to Sta. 10+76.563 will be made at the applicable contract price, which payment shall constitute full compensation for the confluence/invert transition except earthwork and except weepholes, complete, including details of Section Q and Section P shown on drawing "S6", and including details of Section R, Section S, and Section T shown on drawing "S7", and including extended headwall shown on drawing "S3",; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for pipe safety hand rail, chain link fencing and double swing gate.

PART 18 **BOX CONDUIT @ BUFFALO DRIVE, STA. 70+34.000 to STA. 70+58.784 (Bid Item 0020) (Note: Other portion of Box Conduit @ Buffalo Drive, Sta. 70+20.372 to Sta 70+34.000 is in the Option Item No. 2).**

Payment for Box Conduit @ Buffalo Drive, Sta. 70+34.000 to Sta. 70+58.784 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit except removal of existing gabion and existing low flow channel, including furnishing and installation of the temporary grouted riprap transition structure as identified in Section 01200 GENERAL REQUIREMENTS, paragraph BUFFALO ROAD RCB PHASE 1 (Measurement of grouted riprap placed will be made only within the pay lines of the temporary grouted riprap transition structure as identified in Section 01200 GENERAL REQUIREMENTS, paragraph BUFFALO ROAD RCB PHASE 1), including temporary concrete k-rail traffic safety barriers that may be required for safety, except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 19 **TRAPEZOIDAL TO RECTANGULAR CHANNEL TRANSITION**, STA. 70+95.214 to STA. 71+15.521 (Bid Item 0021).

Payment for **Trapezoidal to Rectangular Channel Transition**, Sta. 70+95.214 to Sta. 71+15.521 will be made at the applicable contract price, which payment shall constitute full compensation for the trapezoidal to rectangular transition except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 20 BUFFALO LATERAL, STA. 10+76.563 to STA. 12+10.198 (Bid Item 0022).

Payment for Buffalo Lateral, Sta. 10+76.563 to Sta. 12+10.198 will be made at the applicable contract price, which payment shall constitute full compensation for the box culvert (conduit) and stub-outs except earthwork and except manholes, complete, including bulkhead shown on drawing "S8"; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; **protect in place combination air valve;** and all incidentals, complete as shown on the drawings.

PART 21 SIDE DRAINS (Bid Items 0023, 0024, 0025, 0026, 0027, 0028, 0029).

Payment for **the various** side drains and stub-outs will be made at the applicable contract price, which payment shall constitute full compensation for the side drain and stub-outs, complete, as shown on the drawings, **except** earthwork; furnishing and placing reinforcing steel; furnishing, placing,

finishing and curing concrete for the side drain junction structures and inlet structure; furnishing and placing all lengths of concrete pipe as shown on the "C" drawings, fittings and end sections and concrete thrust blocks; and placing temporary pipe barriers (plugs) for stub-outs as necessary. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided and no payment will be made under this item for inlets, grates, concrete, and concrete pipe for which separate payment is provided.

PART 22 **SLOTTED CHAMBER, STA. 42+62.879 RT** (Bid Item 0030).

Payment for the **Slotted Chamber, Sta. 42+62.879 RT** will be made at the applicable contract price for each slotted chamber which payment shall constitute full compensation for the slotted chamber complete, including slabs and walls (excluding main channel wall), excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; furnishing and placing all lengths of concrete pipe as shown on the "C" drawings, fittings and end sections and concrete thrust blocks; and placing temporary pipe barrier (plug) for stub-out, manhole frame and cover and all incidentals, complete as shown on the drawings. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided and no payment will be made under this item for inlets, grates, concrete, and concrete pipe for which separate payment is provided.

PART 23 21 FOOT CHANNEL (Bid Item 0031).

Payment for 21 Foot Channel will be made at the application contract lump sum price, which payment shall constitute full compensation for the 21 foot channel, complete, including excavation and compacted fill; furnishing and placing riprap; furnishing and placing all appurtenances; and all incidentals, complete as shown on the drawings.

PART 24 **INLET STRUCTURE, SINGLE RCP STA. 55+03.050 RT and INLET STRUCTURE, DOUBLE RCP STA. 56+23.050 LT AND RT (Bid Item 0032 and 0034)**.

Payment for the **Inlet Structure, Single RCP Sta. 55+03.050 RT and Inlet Structure, Double RCP Sta. 56+23.050 LT and RT**, will be made at the application contract lump sum price, which payment shall constitute full compensation for the inlet structure, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; connecting to concrete pipe stub-outs from related side drain structure, furnishing and placing riprap; furnishing and placing all appurtenances, including galvanized trash racks; and all incidentals, complete as shown on the drawings.

PART 25 43 FOOT CHANNEL & TENAYA WAY ROAD MODIFICATIONS (Bid Item 0033).

Payment for 43 Foot Channel & Tenaya Way Road Modifications will be made at the application contract lump sum price, which payment shall constitute full compensation for the 43 foot channel & Tenaya Way Road modifications, complete, including all necessary sawcutting of existing concrete structures and plantmix bituminous surfaces (PBS) requiring sawcutting; including excavation and compacted fill; furnishing, forming, placing concrete cutoff walls, concrete inlet ramp, concrete channel; furnishing and placing riprap; grading, scarifying compacted road subgrade; furnishing, and placing compacted type II aggregate base course; furnishing, and placing compacted plantmix bituminous surface (PBS) furnishing and placing all appurtenances including drain; and all incidentals, complete as shown on the drawings "D4" and "D5". Contractor is informed that removal costs of PBS and concrete is covered under CLEAR SITE AND REMOVE OBSTRUCTIONS Bid Item

PART 26 TIOGA STREET REMOVAL AND RECONSTRUCTION (Bid Item 0035).

Payment for Tioga Street Removal and Reconstruction will be made at the applicable contract lump sum price, and shall be considered full payment for saw cutting, demolition, removal, hauling and disposal of asphaltic concrete; demolition, removal, disposal and replacement of existing curb and gutter; protection of existing landscaping; protect and support existing water, gas, and fiber optic lines and other utility lines; repair/replacement of irrigation lines; all required excavation and compacted fill; furnishing and placing the aggregate base course, complete, including subgrade preparation; asphalt concrete pavement in place, complete, including tack coat, prime coat and appurtenant work such as pavement markings; and traffic barricades/control and signage, complete.

PART 27 TENAYA/DIABLO STORM DRAIN SYSTEM FOR SIDE DRAIN, STA 58+21.761 RT (Bid Item 0036)

Payment for Tenaya/Diablo Storm Drain System for Side Drain, Sta. 58+21.761 RT will be made at the application contract lump sum price, which payment shall constitute full compensation for the Tenaya/Diablo storm drain system for connection to side drain stub-out, sta. 58+21.761, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; furnishing and placing all lengths of concrete pipe as shown on the "D" drawings, fittings and end sections and concrete thrust blocks; connecting to concrete pipe stub-outs from side drain, sta. 58+21.761; furnishing and placing riprap; furnishing and placing all appurtenances; and all incidentals, complete as shown on the drawings.

PART 28 TENAYA/ELDRIDGE STORM DRAIN SYSTEM FOR SIDE DRAIN, STA 61+30.000 RT (Bid Item 0037)

Payment for Tenaya/Eldridge Storm Drain System for Side Drain, Sta. 61+30.000 RT will be made at the application contract lump sum price, which payment shall constitute full compensation for the Tenaya/Eldridge storm drain system for connection to side drain stub-out, sta. 61+30.000, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; furnishing and placing all lengths of concrete pipe as shown on the "D" drawings, fittings and end sections and concrete thrust blocks; connecting to concrete pipe stub-outs from side drain, sta. 61+30.000; furnishing and placing riprap; furnishing and placing all appurtenances; and all incidentals, complete as shown on the drawings.

PART 29 MANHOLES FOR BOX CONDUITS, CULVERTS, AND LATERALS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 46+51.092 (Bid Item 0038).

Payment for Manholes for Box Conduits, Culverts, and Laterals, except between Sta. 51+75.702 to Sta. 46+51.092 will be paid for according to the applicable contract lump sum price including, excavation, backfill and appurtenances complete and in place, except for ladder systems. No extra payment will be made for pipe fittings required to make connections to manholes.

PART 30 ACCESS ROAD @ DURANGO HIGH SCHOOL (Bid Item 0039).

Payment for Access Road @ Durango High School will be made at the applicable contract lump sum price, and shall be considered full payment for saw cutting, demolition, removal, hauling and disposal of asphaltic concrete; all required excavation and compacted fill; furnishing and placing the aggregate base course, complete, including subgrade preparation; plantmix bituminous surface (PBS) in place, complete, including tack coat, prime coat and appurtenant work such as pavement markings; and traffic control and signage, complete.

PART 31 ROAD DETOURS @ BUFFALO/TIOGA (Bid Item 0040).

Payment for Road Detours @ Buffalo/Tioga will be made at the applicable contract lump sum price, and shall be considered full payment for saw cutting, demolition, removal, hauling and disposal of asphaltic concrete; protect and support existing water, gas, **test station, test station anode box, manholes,** and fiber optic lines; all required excavation and compacted fill; **adjusting blow-off assemblies; relocate combination air valve;** furnishing and placing the aggregate base course, complete, including subgrade preparation; plantmix bituminous surface (PBS) in place, complete,

including tack coat, prime coat and appurtenant work such as pavement striping; relocate street light pull box, and traffic control and signage, complete.

PART 32 CHAIN LINK FENCE, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0041).

32.1 Measurement.

Measurement of chain link fence will be by the linear meters of chain link fencing constructed as shown on the drawings.

32.2 Payment.

Payment for **Chain Link Fence, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to STA. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for chain link fencing, including posts with caps, rail, chain link fabric, stretcher bars, tension bands, wire ties, truss wire, sleeves, grout, grounding, and all incidentals, complete as shown on the drawings.

PART 33 PIPE SAFETY RAILING, EXCEPT BETWEEN STA. 46+52.000 TO STA. 45+14.894 AND BETWEEN STA. 70+20.000 TO STA. 70+21.000 (Bid Item 0042).

33.1 Measurement

Measurement of Pipe Safety Railing that is provided will be by the linear meter of pipe safety railing constructed as shown on the drawings.

33.2 Payment

Payment for **Pipe Safety Railing, Except Between Sta. 46+52.000 to Sta. 45+14.894 and Between Sta. 70+20.000 to Sta. 70+21.000** will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for Pipe Safety Railing, including pipe railing and posts, safety chain gates, galvanized anchor bolt assemblies, fabrication, grout or dry pack, surface preparation and painting, and all incidentals, complete.

PART 34 CABLE SAFETY RAILING, EXCEPT BETWEEN **STA. 70+20.372** TO STA. 69+80.000 (Bid Item 0043).

34.1 Measurement

Measurement of Cable Safety Railing will be by the linear meter, measured from end to end, of railing installed as shown on the drawings.

34.2 Payment

Payment **Cable Safety Railing, Except Between Sta. 70+37.278 to Sta. 69+80.000** will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for railing, including posts, cable, safety chain gates, galvanized appurtenances, fabrication, post sleeves, grout or dry pack, and all incidentals, complete.

PART 35 DOUBLE SWING GATES, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0044).

35.1 Measurement

Measurement of double swing gates will be the number of double swing gates acceptably installed.

35.2 Payment.

Payment for **Double Swing Gate, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to Sta. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for fabricating and installing the double swing gates, complete, including posts with caps, chain link fabric, frame members, tension bands, truss rods, stretcher bars, wire ties, truss wire, sleeves, hinges, grout, padlocks, and all incidentals, complete, as shown on the drawings.

PART 36 SOIL STABILIZER, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0045).

36.1 Measurement.

Measurement of soil stabilizer will be made on the basis of the actual area in square meters of exposed excavation and fill surfaces in the construction areas treated with soil stabilizer as indicated or directed.

36.2 Payment

Payment for **Soil Stabilizer Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to Sta. 69+80.000** will be at the applicable contract price, which payment shall constitute full compensation for the soil stabilizer including materials, processing, hauling, and placing, complete in place.

PART 37 STATION MARKINGS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 AND BETWEEN **STA. 70+34.000** TO STA. 69+80.000 (Bid Item 0046).

Payment for **Station Markings, Except Between Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+34.000 to Sta. 69+80.000** will be made at the

applicable contract lump sum price, which shall be considered full payment for preparation, paint and marking, equipment and labor.

PART 38 AS-BUILT DRAWINGS (Bid Item 0047).

38.1 Measurement

Measurement shall be made on a lump sum basis.

38.2 Payment

Payment for As-Built Drawings will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all labor, material, and equipment complete in place for the complete set of as-built drawings, including electronic MicroStation SE or MicroStation J "DGN" file format and PEN FILES/TABLES on Compact Disk, indicating installation of work items not installed according to the contract drawings.

PART 39 DEWEY STREET REMOVAL AND REPLACEMENT STA. 56+00.000 to STA. 51+75.702 (Bid Item 0048).

Payment for Dewey Street Removal and Replacement, Sta. 56+00.000 to Sta. 51+75.702 will be made at the applicable contract lump sum price, and shall be considered full payment as per the following.

39.1 Dewey Street Road Closure and Detour Plan

Dewey Street Road Closure and Detour Plan shall include all necessary road closure and detours and plans/submittals and related items as shown in the "D" drawings including notifications, traffic control, signage, and phasing of closure and detours and maintainance of such closure and detour features for the duration of the project.

39.2 Removal

The following items and features between Station 56+00.000 and 51+75.702 are to be removed by sawcutting, demolition, hauling and disposal as shown on the drawing DEWEY DRIVE REMOVAL PLAN: concrete valley gutter; concrete sidewalk; "L" type curb & gutter; "A" type curb & gutter; roadway plantmix bituminous surface (PBS); parking lot PBS; landscaping and landscape watering system; landscape pull box; sod; other concrete gutter w/ curbs; under sidewalk drain; 6' cmu wall.

39.3 Removal and Storage for Reinstallation

The following items and features between Station 56+00.000 and 51+75.702 are to be removed or dismantled, and stored, and maintained, and kept alive

if organic, as necessary, for reinstallation as shown on the drawing DEWEY DRIVE REMOVAL PLAN and on the drawing PLAN & PROFILE STA 10+00 - STA 20+00 and on the drawing PLAN & PROFILE STA 20+00 - STA 27+26 and on the drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE: Palm Trees; Ground Mounted Signs; 250 Watt HPS streetlight assemblies; water valve box assemblies; Sprint vault; 5' chain link fence; pole mounted signs.

39.4 Protect In Place

The following items and features between Station 56+00.000 and 51+75.702 are to be protected in place as shown on the drawing DEWEY DRIVE REMOVAL PLAN: parking lot light/foundation; fire hydrant.

39.5 Replacement Items

The following items and features between Station 56+00.000 and 51+75.702 are to be provided, complete, as shown on the drawing PLAN & PROFILE STA 10+00 - STA 20+00 and on the drawing PLAN & PROFILE STA 20+00 - STA 27+26 and on the drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE: construct plantmix bituminous surface (PBS) per pavement section; construct 2 1/2" PBS, 4" type II, prime coat (off site); construct "L" type curb & gutter per std dwg 216; construct 5' sidewalk per std dwg 234; construct sidewalk ramp per std dwg 235(case 1); construct sidewalk drain per std dwg 236; construct valley gutter per std dwg 228; construct commercial driveway (option B) per std dwg 225; construct "A" type curb & gutter per std dwg 219; construct "on-site" concrete channel per "ON-SITE" CONCRETE CHANNEL detail on drawing PLAN & PROFILE STA 20+00 - STA 27+26; install removed 5' chain link fence;

39.6 Restore, Replant, Install and Reinstall Items

The following items and features between Station 56+00.000 and 51+75.702 are to be restored, complete, as shown on the drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE: restore landscaping and landscaping watering system; install sod to match existing and surrounding; replant palm trees; reinstall removed ground mounted signs; reinstall removed pole mounted signs; install new ground mounted sign; install type 1 centerline per std dwg 244; install storage lane line per std dwg 246; install 24" white stop line (cold polymer film type 1); white pavement arrow (cold polymer film type 1) per detail on drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE; white pavement "ONLY" (cold polymer film type 1) per detail on drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE; white "24" longitudinal crosswalk lines, longitudinal lines shall align w/ lane lines and center of lanes (cold polymer film type 1) per std dwg 254A; 4" white paint line; reinstall removed 100 HPS streetlight per std dwg 314; 1-1/4" conduit w/ (2)#4, (1)#8 gnd, thw copper wire (connect to exist circuit in pull box @ SW corner of Rainbow/Dewey; 1-1/4" conduit only.

39.7 STORAGE ONE Sign Removal, Storage and/or Temporary Reinstallation and Permanent Reinstallation

Remove the existing STORAGE ONE sign and existing ground foundation at approximate station 52+30 and place the sign into storage or temporary

reinstallation as directed by the Contracting Officer. The Contractor shall permanently reinstall the sign once the signs new ground foundation (new ground foundation shall have the same design as removed ground foundation, including materials and function) has been installed by the Contractor in the same location as the previous ground foundation.

PART 40 0.250 M (10 INCH) SEWER @ TENAYA WAY (Bid Item 0049).

Payment for **0.250 m (10 inch) Sewer @ Tenaya Way** will be made at the applicable contract price, which payment shall constitute full compensation for provision of and installation of new utility and appurtenances, as shown on the drawings; **including removal of existing 0.250 m PVC pipe (about 35 M), removal of two existing sewer manholes; including furnishing and installation of 0.250 m PVC pipe (about 24 m), furnishing and installation of 0.250 m ductile iron pipe (about 10 m), furnishing and installation of two flex couplings for 0.250 m pipe, furnishing and installation of 2 new manholes; and including temporary sewer bypass that the Contractor must furnish and install and maintain until permanent work is accomplished, complete.** The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

PART 41 0.300 M (12 INCH) WATERLINE @ BUFFALO DRIVE (Bid Item 0050).

Payment for **0.300 m (12 inch) Waterline @ Buffalo Drive** will be made at the applicable contract price, which payment shall constitute full compensation for provision of and installation of new utility and appurtenances, as shown on the drawings; **including removal of existing 0.300 m PVC pipe (about 54 m), removal of existing thrust blocks (about 4), removal of existing RCP casing (about 16 m), removal of bends; including furnishing and installation of new 0.300 m PVC pipe (about 55 m), furnishing and installation of 0.300 m Ductile Iron Pipe (about 7 m), furnishing and installation of megalug flange (2 each), furnishing and installation of new thrust blocks (about 4), furnishing and installation of new RCP casing (about 10 m), furnishing and installation of 22.5 degree bends (4 each) and including temporary potable waterline bypass that the Contractor may have to furnish and install and maintain meeting potable water standards and potable water material standards until permanent work is accomplished, complete.** The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

PART 42 LADDER SYSTEMS, EXCEPT BETWEEN STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0051)

Payment for **Ladder Systems, Except Between Sta. 51+75.702 to Sta. 45+14.894** will be made at the applicable contract lump sum price for installation of all channel access ladders, including access ladders for Manholes for Box Conduits. The contract price for ladder system shall be considered full payment for fabrication, assembly fittings, finishing, paint and marking, installation of ladder steps, and all equipment, labor and fittings.

PART 43 CLEAR SITE AND REMOVE OBSTRUCTIONS, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0052).

Payment for **Clear Site and Remove Obstructions, Sta. 51+75.702 to Sta. 45+14.894** shall include all costs for clearing, removal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area. Except as otherwise specified, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines, including removal of sewer line at Rainbow Boulevard and capping of ends of sewer line as indicated in the drawing; and including removal of existing concrete pavement and concrete curb and gutter and plantmix bituminous surface (pbs) as shown on the drawings; and including removal of existing gabions consisting of gabion cages, gabion hold downs and gabion rocks; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Channel right-of-way and temporary construction easement; including removal of existing riprap rock; removal protection, replacement or restoration of existing structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work, complete.

PART 44 EXCAVATION, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0053).

44.1 Measurement.

A survey of the site shall be made prior to commencement of work, and all measurements will be based on this survey without regard to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and the ground surfaces as indicated by the above mentioned survey. The quantity of directed excavation necessary for the removal of unsatisfactory foundation material as specified shall be included in the measurement of the excavation where the unsuitable soils are encountered. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. The total quantity of excavated material for which payment will be made will be the theoretical quantity between the ground surface as determined by a survey and the grade and slope of the theoretical cross sections indicated. No allowance will be made for overdepth excavation or for the removal of any material outside the required slope lines. All excavation outside of excavation lines shown on the drawings will be considered as being for the convenience of the Contractor.

44.2 Payment.

Payment for **Excavation, Sta. 51+75.702 to Sta. 45+14.894** will be made for costs associated with excavation for the channel at the applicable contract price, which payment shall constitute full compensation for excavating the channel, and other areas as indicated on the drawings, including shoring, rock removal, and cemented alluvium excavation; shaping and trimming of areas to receive concrete; including foundation preparation; crushing or otherwise processing, loading, stockpiling, hauling, and placing suitable materials for compacted fill; Including crushing/processing, loading, hauling, placing excess satisfactory excavated materials at disposal site shown on drawings. Payment will not be included for excavation (including shoring) outside the excavation limits indicated on the drawings or staked in the field, and other excavation requirements for which separate payments are provided.

44.3 Unsatisfactory Soils

No separate payment will be made for the excavation, hauling, and disposal of unsatisfactory soils. When such excavation is directed, payment therefore will be included in the applicable contract price for the items of work under which the unsuitable soils are encountered. When there is no applicable contract item an adjustment will be made.

44.4 Excavation for Structures

No separate payment will be made for excavation for structures. All costs therefore shall be included in the applicable contract item to which the work applies.

44.5 Excavation for Utilities

No separate payment will be made for excavation for utilities. All costs therefore shall be included in the applicable contract item to which the work applies.

44.6 Shoring

When shoring is indicated or directed for items for which separate payment is made, payment will be included in the applicable contract price for the items of work under which the shoring is placed.

PART 45 COMPACTED FILL, STA. 51+75.702 TO STA. 45+14.894

45.1 Measurement.

Measurement for fills will be made between the excavation and structure lines and the fill limit lines, or between the ground lines and fill lines,

as indicated or staked in the field. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections.

45.2 Payment.

45.2.1 **COMPACTED FILL, CHANNEL, STA. 51+75.702 TO STA. 45+14.894** (Bid Item 0054).

Payment for **Compacted Fill, Channel, Sta. 51+75.702 to Sta. 45+14.894 and Between Sta. 70+37.278 to Sta. 69+80.000** will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, **including at disposal site shown on drawing GRADING PLAN, STA. 49+20.000 TO 42+00.000,** and compacting the fill, complete. Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

45.2.2 Fill for Structures.

No separate payment will be made for fill or backfill around structures. All such costs shall be included in the applicable contract prices for structure items to which the work applies.

45.2.3 Trenches.

No separate payment will be made for backfilling for utilities, side drains and confluences. All costs in connection therewith shall be included in the contract prices for items to which the work applies.

45.2.4 Subgrade Preparation.

No separate payment will be made for subgrade preparation and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

PART 46 CONCRETE, STA. 46+51.092 TO STA. 45+14.894.

46.1 Measurement.

Measurement of concrete will be made on the basis of the actual volume, in **cubic meters**, of concrete within the pay lines of the concrete invert slab, walls, top slab, and slope protection as shown on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structures. No deductions will be made for rounded or beveled edges or

space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meter in cross section. Concrete placed in items of work other than those specifically mentioned above, and concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment.

46.2 Payment.

Payment for the concrete items will be made at the applicable contract prices for the various items of the schedule, which payments shall constitute full compensation for labor, materials (except reinforcing steel for which separate payment is provided), joint sealant, forming, furnishing concrete, placing concrete, finishing concrete, curing concrete, and for all equipment and tools to complete the concrete work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. No payment will be made for concrete, as such, which is placed in structures for which payment is made on a lump sum basis.

46.2.1 CONCRETE, CHANNEL INVERT SLAB, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0055).

Payment for **Concrete, Channel Invert Slab, Sta. 46+51.092 to Sta. 45+14.894** will be made at the applicable contract price, which shall constitute full compensation for all concrete (including all necessary items described in **Paragraph 46.2 above**) placed for the invert slab of the channel, keys, starter walls, and cut-off walls, complete.

46.2.2 CONCRETE, CHANNEL WALLS, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0056).

Payment for **Concrete, Channel Walls, Sta. 46+51.092 to Sta. 45+14.894** will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in **Paragraph 46.2 above**) placed above the starter walls in the vertical walls of the channel, the walls of the warped transition structures, including wall height transitions, complete.

46.2.3 Concrete, Cut-off Wall.

No separate payment will be made for concrete, cut-off walls and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

46.2.4 Concrete, Transition

Payment for concrete, transition and all costs in connection therewith shall be included in the contract prices for concrete, channel walls and

concrete, channel invert slab or to the applicable contract price for which the work applies.

PART 47 REINFORCING STEEL, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0057).

47.1 Measurement.

Measurement of reinforcing steel in metric tonnes (1,000 kilograms) is limited to reinforcement in concrete structures paid for on a cubic meters basis. Measurement will be made of the lengths of bars actually placed in the completed work in accordance with the plans and specifications, approved bar schedules, or as directed. The measured lengths will converted to weights for the bar numbers listed by the unit weights per linear foot contained in ASTM A 615. Steel in laps indicated on the drawings, in the specifications, or required by the Contracting Officer will be included in measurement for payment. No measurement will be made for the additional steel in laps which are authorized for the convenience of the Contractor. No measurement will be made of steel supports or spacers. All costs for furnishing and installing supports and spacers shall be included in the various structures requiring the reinforcement.

47.2 Payment.

Payment for **Reinforcing Steel, Sta. 46+51.092 to Sta. 45+14.894** will be made at the applicable contract price, which payment shall constitute full compensation for furnishing and installing steel reinforcement, complete. No payment will be made for steel reinforcement which is placed in structures for which payment is made on a lump sum basis.

PART 48 AGGREGATE BASE COURSE, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0058).

48.1 Measurement.

Measurement of aggregate base course will be by the metric tonne (1,000 kilograms) of aggregate base course placed within the lines and grades indicated on the drawings.

48.2 Payment.

Payment for **Aggregate Base Course, Sta. 46+51.092 to Sta. 45+14.894** will be made at the applicable contract price which payment shall constitute full compensation for earthwork required for installation of aggregate base course, furnishing and placing the aggregate base course, complete, including subgrade preparation.

PART 49 ASPHALT CONCRETE PAVEMENT, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0059).

49.1 Measurement.

Measurement for asphalt concrete pavement will be by the metric tonne (1,000 kilograms) of asphalt concrete pavement placed within the lines and grades as indicated on the drawing.

49.2 Payment.

Payment for **Asphalt Concrete Pavement, Sta. 46+51.092 to Sta. 45+14.894** will be made at the applicable contract price which payment shall constitute full compensation for asphalt concrete pavement in place, complete including tack coat, prime coat and appurtenant work except for aggregate base course. No payment will be made for excessive thickness.

PART 50 WEEPHOLE SYSTEM, STA. 46+51.092 TO STA. 45+14.894 (Bid Item 0060).

Payment for the **Weephole System, Sta. 46+51.092 to Sta. 45+14.894** will be made at the applicable contract price, which payment shall constitute full compensation for materials, and installation of the weephole system, complete including applicable earthwork, drain aggregate, geotextile, form openings and appurtenances, complete.

PART 51 **INVERT ACCESS RAMP, STA. 45+14.894 to STA. 45+76.000** (Bid Item 0061).

Payment for **Invert Access Ramp, Sta. 45+14.894 to Sta. 45+76.000** also includes the adjacent open channel from Sta. 45+14.894 to Sta. 45+76.000. Payment will be made at the applicable contract price, which payment shall constitute full compensation for the invert access ramp and open channel except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; including pipe access gate installed at top of access ramp to restrict vehicle access into channel invert and all appurtenances; and all incidentals, complete as shown on the drawings except for pipe safety hand rail, chain link fencing, and double swing gate.

PART 52 BOX CONDUIT @ REDWOOD STREET, STA. 46+51.092 to STA. 46+87.668 (Bid Item 0062).

Payment for Box Conduit @ Redwood Street, Sta. 46+51.092 to Sta. 46+87.668 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit except earthwork and except manholes, complete, including furnishing and placing reinforcing

steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 53 CHANNEL BOX CONDUIT, STA. 46+87.668 TO STA. 47+04.000 (Bid Item 0063).

Payment for Channel Box Conduit, Sta. 46+87.668 to Sta. 47+04.000 will be made at the applicable contract price, which payment shall constitute full compensation for the channel box conduit except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 54 COVERED CONFLUENCE/INVERT TRANSITION (SECTION R), STA. 47+04.000 to STA. 49+73.000 (Bid Item 0064).

Payment for Covered Confluence/Invert Transition (Section R), Sta. 47+04.000 to Sta. 49+73.000 will be made at the applicable contract price, which payment shall constitute full compensation for the covered confluence/invert transition (section r) except earthwork and except manholes, complete, including details of Section R shown on drawing "S5"; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings.

PART 55 CHANNEL BOX CONDUIT (SECTION S), STA. 49+73.000 to STA. 49+93.000 AND PORTION OF RAINBOW LATERAL, STA. 9+99.100 to STA. 10+19.983 (Bid Item 0065).

Payment for Channel Box Conduit (Section S), Sta. 49+73.000 to Sta. 49+93.000 and Portion of Rainbow Lateral, Sta. 9+99.100 to Sta. 10+19.983 will be made at the applicable contract price, which payment shall constitute full compensation for the channel box conduit section s and portion of Rainbow Lateral except earthwork, complete, including details of Section Q and Section P shown on drawing "S4", and including details of Section S shown on drawing "S5"; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings.

PART 56 CHANNEL BOX CONDUIT, STA. 49+93.000 to STA. 50+37.018 (Bid Item 0066).

Payment for Channel Box Conduit, Sta. 49+93.000 to Sta. 50+37.018 will be made at the applicable contract price, which payment shall constitute full compensation for the channel box conduit except earthwork, complete,

including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings.

PART 57 BOX CONDUIT @ RAINBOW BLVD., STA. 50+37.018 to STA. 50+88.000 (Bid Item 0067).

Payment for Box Conduit @ Rainbow Blvd., Sta. 50+37.018 to Sta. 50+88.000 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings.

PART 58 TRANSITION STRUCTURE, STA. 50+88.000 to STA. 51+38.000 (Bid Item 0068).

Payment for Transition Structure, Sta. 50+88.000 to Sta. 51+38.000 will be made at the applicable contract price, which payment shall constitute full compensation for the transition structure (box conduit) except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 59 CHANNEL BOX CONDUIT, STA. 51+38.000 to 51+75.702 (Bid Item 0069).

Payment for Channel Box Conduit, Sta. 51+38.000 to Sta. 51+75.702 will be made at the applicable contract price, which payment shall constitute full compensation for the channel box conduit except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 60 RAINBOW LATERAL, STA. 10+19.983 to STA. 11+38.403 (Bid Item 0070).

Payment for Rainbow Lateral, Sta. 10+19.983 to Sta. 11+38.403 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit and stub-outs except earthwork and except manholes, complete, and bulkhead shown on drawing "S8"; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings.

PART 61 SIDE DRAINS (Bid Items 0071, 0072, 0073, 0074).

Payment for **the various** side drain and stub-outs will be made at the applicable contract price, which payment shall constitute full compensation

for the side drain and stub-outs, complete, as shown on the drawings, **except** earthwork; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete for the side drain junction structures and inlet structure; furnishing and placing all lengths of concrete pipe as shown on the "C" drawings, fittings and end sections and concrete thrust blocks; and placing temporary pipe barriers (plugs) for stub-outs as necessary. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided and no payment will be made under this item for inlets, grates, concrete, and concrete pipe for which separate payment is provided.

PART 62 DROP INLET STRUCTURE FOR SIDE DRAIN, STA. 48+67.994 RT (Bid Item 0075).

Payment for Drop Inlet Structure For Side Drain, Sta. 48+67.994 RT will be made at the application contract lump sum price, which payment shall constitute full compensation for the drop inlet structure connection to side drain stub-out, sta. 48+67.994 RT, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; connecting to concrete pipe stub-outs from side drain, sta. 48+67.994; furnishing and placing all appurtenances; and all incidentals, complete as shown on the drawings.

PART 63 RAINBOW/DEWEY STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 50+76.739 RT (Bid Item 0076).

Payment for the Rainbow/Dewey Storm Drain System for Side Drain, Sta. 50+76.739 RT will be made at the application contract lump sum price, which payment shall constitute full compensation for the Rainbow/Dewey storm drain system for connection to side drain stub-out, sta. 50+76.739 RT, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; furnishing and placing all lengths of concrete pipe as shown on the "D" drawings, fittings and end sections and concrete thrust blocks; connecting to concrete pipe stub-outs from side drain, sta. 50+76.739 RT; furnishing and placing riprap; furnishing and placing all appurtenances; and all incidentals, complete as shown on the drawings.

PART 64 RAINBOW/DEWEY STORM DRAIN SYSTEM FOR SIDE DRAIN, STA. 50+84.247 RT (Bid Item 0077).

Payment for the Rainbow/Dewey Storm Drain System for Side Drain, Sta. 50+84.247 RT will be made at the application contract lump sum price, which payment shall constitute full compensation for the Rainbow/Dewey storm drain system for connection to side drain stub-out, sta. 50+84.247 RT, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete;

furnishing and placing all lengths of concrete pipe as shown on the "D" drawings, fittings and end sections and concrete thrust blocks; connecting to concrete pipe stub-outs from side drain, sta. 50+84.247 RT; furnishing and placing riprap; furnishing and placing all appurtenances; and all incidentals, complete as shown on the drawings.

PART 65 ROAD DETOURS @ RAINBOW BLVD (Bid Item 0078).

Payment for Road Detours @ Rainbow Blvd will be made at the applicable contract lump sum price, and shall be considered full payment for saw cutting, demolition, removal, hauling and disposal of asphaltic concrete; demolition, removal, disposal and replacement of existing curb and gutter; removal and replacement of existing medians in Rainbow Boulevard; protection of existing landscaping; protect and support existing water, gas, and fiber optic lines; repair/replacement of irrigation lines; all required excavation and compacted fill; furnishing and placing the aggregate base course, complete, including subgrade preparation; asphalt concrete pavement in place, complete, including tack coat, prime coat and appurtenant work such as pavement markings; and traffic control and signage, complete.

PART 66 **MANHOLES FOR BOX CONDUITS, CULVERTS, AND LATERALS BETWEEN STA. 51+75.702 TO STA. 45+14.894** (Bid Item 0079).

Payment for **Manholes for Box Conduits, Culverts, and Laterals Between Sta. 51+75.702 to Sta. 45+14.894** will be paid for according to the applicable contract lump sum price including, excavation, backfill and appurtenances complete and in place, except for ladder systems. No extra payment will be made for pipe fittings required to make connections to manholes.

PART 67 STREET/SIGNAGE MODIFICATIONS, REDWOOD STREET (Bid Item 0080).

Payment for Street/Signage Modifications, Redwood Street will be made at the applicable contract price, which payment shall constitute full compensation for street/signage work, including necessary earthwork, including removal of concrete sidewalk, removal of concrete curb and gutter, removal of plantmix bituminous surface (PBS), removal of ground mounted sign, installation of portable concrete barrier rail, installation of ground mounted sign, addition of sign panel to existing ground mounted sign, as shown on the "D" drawings, complete. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

PART 68 CHAIN LINK FENCE, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0081).

68.1 Measurement.

Measurement of chain link fence will be by the linear meters of chain link fencing constructed as shown on the drawings.

68.2 Payment.

Payment for **Chain Link Fence, Sta. 51+75.702 to Sta. 45+14.894** will be made at the applicable contract price, which payment shall constitute full compensation for chain link fencing, including posts with caps, rail, chain

link fabric, stretcher bars, tension bands, wire ties, truss wire, sleeves, grout, grounding, and all incidentals, complete as shown on the drawings.

PART 69 PIPE SAFETY RAILING, BETWEEN STA. 46+52.000 TO STA. 45+14.894 (Bid Item 0082).

69.1 Measurement

Measurement of Pipe Safety Railing that is provided will be by the linear meter of pipe safety railing constructed as shown on the drawings.

69.2 Payment

Payment for **Pipe Safety Railing, Between Sta. 46+52.000 to Sta. 45+14.894** will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for Pipe Safety Railing, including pipe railing and posts, safety chain gates, galvanized anchor bolt assemblies, fabrication, grout or dry pack, surface preparation and painting, and all incidentals, complete.

PART 70 **DEWEY STREET REMOVAL AND REPLACEMENT, STA. 51+75.702 TO STA. 50+59.000** (Bid Item 0083).

Payment for **Dewey Street Removal and Replacement, Sta. 51+75.702 to Sta. 50+59.000** will be made at the applicable contract lump sum price, and shall be considered full payment as per the following.

70.1 Removal

The following items and features between Station 51+75.702 and 50+59.000 are to be removed by sawcutting, demolition, hauling and disposal as shown on the drawing DEWEY DRIVE REMOVAL PLAN: concrete valley gutter; concrete sidewalk; "L" type curb & gutter; "A" type curb & gutter; roadway plantmix bituminous surface (PBS); parking lot PBS; landscaping and landscape watering system; landscape pull box; sod; other concrete gutter w/ curbs; under sidewalk drain; 6' cmu wall.

70.2 Removal and Storage for Reinstallation

The following items and features between Station 51+75.702 and 50+59.000 are to be removed or dismantled, and stored, and maintained, and kept alive if organic, as necessary, for reinstallation as shown on the drawing DEWEY DRIVE REMOVAL PLAN and on the drawing PLAN & PROFILE STA 10+00 - STA 20+00 and on the drawing PLAN & PROFILE STA 20+00 - STA 27+26 and on the drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE: Palm Trees; Ground Mounted Signs; 250 Watt HPS streetlight assemblies; water valve box assemblies; Sprint vault; 5' chain link fence; pole mounted signs.

70.3 Protect In Place

The following items and features between Station 51+75.702 and 50+59.000 are to be protected in place as shown on the drawing DEWEY DRIVE REMOVAL PLAN: parking lot light/foundation; fire hydrant.

70.4 Replacement Items

The following items and features between Station 51+75.702 and 50+59.000 are to be provided, complete, as shown on the drawing PLAN & PROFILE STA 10+00 - STA 20+00 and on the drawing PLAN & PROFILE STA 20+00 - STA 27+26 and on the drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE: construct plantmix bituminous surface (PBS) per pavement section; construct 2 1/2" PBS, 4" type II, prime coat (off site); construct "L" type curb & gutter per std dwg 216; construct 5' sidewalk per std dwg 234; construct sidewalk ramp per std dwg 235(case 1); construct sidewalk drain per std dwg 236; construct valley gutter per std dwg 228; construct commercial driveway (option B) per std dwg 225; construct "A" type curb & gutter per std dwg 219; construct "on-site" concrete channel per "ON-SITE" CONCRETE CHANNEL detail on drawing PLAN & PROFILE STA 20+00 - STA 27+26; install removed 5' chain link fence;

70.5 Restore, Replant, Install and Reinstall Items

The following items and features between Station 51+75.702 and 50+59.000 are to be restored, complete, as shown on the drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE: restore landscaping and landscaping watering system; install sod to match existing and surrounding; replant palm trees; reinstall removed ground mounted signs; reinstall removed pole mounted signs; install new ground mounted sign; install type 1 centerline per std dwg 244; install storage lane line per std dwg 246; install 24" white stop line (cold polymer film type 1); white pavement arrow (cold polymer film type 1) per detail on drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE; white pavement "ONLY" (cold polymer film type 1) per detail on drawing LANDSCAPING, STREETLIGHT, SIGNAGE & PAVEMENT MARKING PLAN DEWEY DRIVE; white "24" longitudinal crosswalk lines, longitudinal lines shall align w/ lane lines and center of lanes (cold polymer film type 1) per std dwg 254A; 4" white paint line; reinstall removed 100 HPS streetlight per std dwg 314; 1-1/4" conduit w/ (2)#4, (1)#8 gnd, thw copper wire (connect to exist circuit in pull box @ SW corner of Rainbow/Dewey; 1-1/4" conduit only.

PART 71 0.300 M (12 INCH) WATERLINE @ RAINBOW BOULEVARD (Bid Item 0084)

Payment for **0.300 M (12 inch) Waterline @ Rainbow Boulevard** will be made at the applicable contract price, which payment shall constitute full compensation for provision of and installation of new utility and

appurtenances, as shown on the drawings; **including removal of existing 0.300 m PVC pipe (about 57 M), removal of gate valve, removal of blow-off assembly; including furnishing and installation of 0.300 m PVC pipe (about 46 m), furnishing and installation of 0.300 m ductile iron pipe (about 14 m), furnishing and installation of thrust blocks (8 each), furnishing and installation of RCP casing, furnishing and installation of two flex couplings for 0.300 m pipe, furnishing and installation of megalug flanges (2 each), furnishing and installation of 45 degree bends (4 each), furnishing and installation of 22.5 degree bends (2 each); including temporary potable waterline bypass that the Contractor may furnish and install and maintain meeting potable water standards and potable water material sandards until permanent work is accomplished, complete**. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

PART 72 DOUBLE SWING GATES, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0085).

72.1 Measurement

Measurement of double swing gates will be the number of double swing gates acceptably installed.

72.2 Payment.

Payment for **Double Swing Gates, Sta. 51+75.702 to Sta. 45+14.894** will be made at the applicable contract price, which payment shall constitute full compensation for fabricating and installing the double swing gates, complete, including posts with caps, chain link fabric, frame members, tension bands, truss rods, stretcher bars, wire ties, truss wire, sleeves, hinges, grout, padlocks, and all incidentals, complete, as shown on the drawings.

PART 73 SOIL STABILIZER, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0086).

73.1 Measurement.

Measurement of soil stabilizer will be made on the basis of the actual area in square meters of exposed excavation and fill surfaces in the construction areas treated with soil stabilizer as indicated or directed.

73.2 Payment

Payment for **Soil Stabilizer, Sta. 51+75.702 to Sta. 45+14.894** will be at the applicable contract price, which payment shall constitute full compensation for the soil stabilizer including materials, processing, hauling, and placing, complete in place.

PART 74 STATION MARKINGS, STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0087).

Payment for **Station Markings, Sta. 51+75.702 to Sta. 45+14.894** will be made at the applicable contract lump sum price, which shall be considered full payment for preparation, paint and marking, equipment and labor.

PART 75 LADDER SYSTEMS, BETWEEN **STA. 51+75.702 TO STA. 45+14.894** (Bid Item 0088).

Payment for **Ladder Systems, Between Sta. 51+75.702 to Sta. 45+14.894** will be made at the applicable contract lump sum price for installation of all channel access ladders, including access ladders for Manholes for Box Conduits. The contract price for ladder system shall be considered full payment for fabrication, assembly fittings, finishing, paint and marking, installation of ladder steps, and all equipment, labor and fittings.

PART 76 GROUTED RIPRAP, BETWEEN STA. 51+75.702 TO STA. 45+14.894 (Bid Item 0089)

76.1 Measurement.

Measurement of Grouted Riprap will be made on the basis of the actual volume, in cubic meters, of grouted riprap within the pay lines of the grouted riprap structure as shown on the drawings. Measurement of grouted riprap placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the grouted riprap structure. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meterin cross section. Grouted riprap placed in items of work other than those specifically mentioned above, and grouted riprap and grout and riprap wasted or used for the convenience of the Contractor will not be included in measurement for payment.

76.2 Payment.

Payment for **Grouted Riprap, Between Sta. 51+75.702 to Sta. 45+14.894** will be made at the applicable contract unit price, which payment shall constitute full compensation for obtaining and placing the grouted riprap and grout, complete.

PART 77 CLEAR SITE AND REMOVE OBSTRUCTIONS, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0090).

Payment for Clear Site and Remove Obstructions, Between Sta. 70+34.000 to Sta. 69+80.000 shall include all costs for clearing, removal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area, including the temporary grouted riprap transition structure as identified in Section 01200 GENERAL REQUIREMENTS, paragraph BUFFALO ROAD RCB PHASE 1. Except as otherwise specified, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines, including removal of sewer line at Rainbow Boulevard and capping of ends of sewer line as indicated in the drawing; and including removal of existing

concrete pavement and concrete curb and gutter and plantmix bituminous surface (pbs) as shown on the drawings; and including removal of existing gabions consisting of gabion cages, gabion hold downs and gabion rocks; removal of existing low flow channels; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Channel right-of-way and temporary construction easement; including removal of existing riprap rock; removal protection, replacement or restoration of existing structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work, complete.

PART 78 EXCAVATION, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0091).

78.1 Measurement.

A survey of the site shall be made prior to commencement of work, and all measurements will be based on this survey without regard to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and the ground surfaces as indicated by the above mentioned survey. The quantity of directed excavation necessary for the removal of unsatisfactory foundation material as specified shall be included in the measurement of the excavation where the unsuitable soils are encountered. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. The total quantity of excavated material for which payment will be made will be the theoretical quantity between the ground surface as determined by a survey and the grade and slope of the theoretical cross sections indicated. No allowance will be made for overdepth excavation or for the removal of any material outside the required slope lines. All excavation outside of excavation lines shown on the drawings will be considered as being for the convenience of the Contractor.

78.2 Payment.

Payment for Excavation, Between Sta. 70+34.000 to Sta. 69+80.000 will be made for costs associated with excavation for the channel at the applicable contract price, which payment shall constitute full compensation for excavating the channel, and other areas as indicated on the drawings, including shoring, rock removal, and cemented alluvium excavation; shaping and trimming of areas to receive concrete; including foundation preparation; crushing or otherwise processing, loading, stockpiling, hauling, and placing suitable materials for compacted fill; Including crushing/processing, loading, hauling, placing excess satisfactory

excavated materials at disposal site shown on drawings. Payment will not be included for excavation (including shoring) outside the excavation limits indicated on the drawings or staked in the field, and other excavation requirements for which separate payments are provided.

78.3 Unsatisfactory Soils

No separate payment will be made for the excavation, hauling, and disposal of unsatisfactory soils. When such excavation is directed, payment therefore will be included in the applicable contract price for the items of work under which the unsuitable soils are encountered. When there is no applicable contract item an adjustment will be made.

78.4 Excavation for Structures

No separate payment will be made for excavation for structures. All costs therefore shall be included in the applicable contract item to which the work applies.

78.5 Excavation for Utilities

No separate payment will be made for excavation for utilities. All costs therefore shall be included in the applicable contract item to which the work applies.

78.6 Shoring

When shoring is indicated or directed for items for which separate payment is made, payment will be included in the applicable contract price for the items of work under which the shoring is placed.

PART 79 COMPACTED FILL, BETWEEN STA. 70+34.000 TO STA. 69+80.000.

79.1 Measurement.

Measurement for fills will be made between the excavation and structure lines and the fill limit lines, or between the ground lines and fill lines, as indicated or staked in the field. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections.

79.2 Payment.

79.2.1 COMPACTED FILL, CHANNEL, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0092).

Payment for COMPACTED FILL, CHANNEL, BETWEEN STA. 70+34.000 TO STA. 69+80.000 will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, and compacting the fill, complete. Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which

separate payments are provided.

79.2.2 Fill for Structures.

No separate payment will be made for fill or backfill around structures. All such costs shall be included in the applicable contract prices for structure items to which the work applies.

79.2.3 Trenches.

No separate payment will be made for backfilling for utilities, side drains and confluences. All costs in connection therewith shall be included in the contract prices for items to which the work applies.

79.2.4 Subgrade Preparation.

No separate payment will be made for subgrade preparation and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

PART 80 CONCRETE, BETWEEN STA. 70+20.372 TO STA. 69+80.000.

80.1 Measurement.

Measurement of concrete will be made on the basis of the actual volume, in cubic meters, of concrete within the pay lines of the concrete invert slab, walls, top slab, and slope protection as shown on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structures. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meter in cross section. Concrete placed in items of work other than those specifically mentioned above, and concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment.

80.2 Payment.

Payment for the concrete items will be made at the applicable contract prices for the various items of the schedule, which payments shall constitute full compensation for labor, materials (except reinforcing steel for which separate payment is provided), joint sealant, forming, furnishing concrete, placing concrete, finishing concrete, curing concrete, and for all equipment and tools to complete the concrete work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. No payment will be made for concrete, as such, which is placed in structures for which payment is made on a lump sum basis.

80.2.1 CONCRETE, CHANNEL INVERT SLAB, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0093).

Payment for Concrete, Channel Invert Slab, Between Sta. 70+20.372 to Sta. 69+80.000 will be made at the applicable contract price, which shall constitute full compensation for all concrete (including all necessary items described in Paragraph 80.2 above) placed for the invert slab of the channel, keys, starter walls, and cut-off walls, complete.

80.2.2 CONCRETE, CHANNEL WALLS, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0094).

Payment for Concrete, Channel Walls, Between Sta. 70+20.372 to Sta. 69+80.000 will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph 80.2 above) placed above the starter walls in the vertical walls of the channel, the walls of the warped transition structures, including wall height transitions, complete.

80.2.3 Concrete, Cut-off Wall.

No separate payment will be made for concrete, cut-off walls and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

80.2.4 Concrete, Transition

Payment for concrete, transition and all costs in connection therewith shall be included in the contract prices for concrete, channel walls and concrete, channel invert slab or to the applicable contract price for which the work applies.

PART 81 REINFORCING STEEL, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0095).

81.1 Measurement.

Measurement of reinforcing steel in metric tonnes (1,000 kilograms) is limited to reinforcement in concrete structures paid for on a cubic meters basis. Measurement will be made of the lengths of bars actually placed in the completed work in accordance with the plans and specifications, approved bar schedules, or as directed. The measured lengths will converted to weights for the bar numbers listed by the unit weights per linear foot contained in ASTM A 615. Steel in laps indicated on the drawings, in the specifications, or required by the Contracting Officer will be included in measurement for payment. No measurement will be made for the additional steel in laps which are authorized for the convenience

of the Contractor. No measurement will be made of steel supports or spacers. All costs for furnishing and installing supports and spacers shall be included in the various structures requiring the reinforcement.

81.2 Payment.

Payment for Reinforcing Steel, Between Sta. 70+20.372 to Sta. 69+80.000 will be made at the applicable contract price, which payment shall constitute full compensation for furnishing and installing steel reinforcement, complete. No payment will be made for steel reinforcement which is placed in structures for which payment is made on a lump sum basis.

PART 82 AGGREGATE BASE COURSE, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0096).

82.1 Measurement.

Measurement of aggregate base course will be by the metric tonne (1,000 kilograms) of aggregate base course placed within the lines and grades indicated on the drawings.

82.2 Payment.

Payment for Aggregate Base Course, Between Sta. 70+34.000 to Sta. 69+80.000 will be made at the applicable contract price which payment shall constitute full compensation for earthwork required for installation of aggregate base course, furnishing and placing the aggregate base course, complete, including subgrade preparation.

PART 83 ASPHALT CONCRETE PAVEMENT, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0097).

83.1 Measurement.

Measurement for asphalt concrete pavement will be by the metric tonne (1,000 kilograms) of asphalt concrete pavement placed within the lines and grades as indicated on the drawing.

83.2 Payment.

Payment for Asphalt Concrete Pavement, Between Sta. 70+34.000 to Sta. 69+80.000 will be made at the applicable contract price which payment shall constitute full compensation for asphalt concrete pavement in place, complete including tack coat, prime coat and appurtenant work except for aggregate base course. No payment will be made for excessive thickness.

PART 84 WEEPHOLE SYSTEM, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0098).

Payment for the Weephole System, Between Sta. 70+20.372 to Sta. 69+80.000 will be made at the applicable contract price, which payment shall constitute full compensation for materials, and installation of the weephole system, complete including applicable earthwork, drain aggregate, geotextile, form openings and appurtenances, complete.

PART 85 CHAIN LINK FENCE, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0099).

85.1 Measurement.

Measurement of chain link fence will be by the linear meters of chain link fencing constructed as shown on the drawings.

85.2 Payment.

Payment for Chain Link Fence, Between Sta. 70+34.000 to Sta. 69+80.000 will be made at the applicable contract price, which payment shall constitute full compensation for chain link fencing, including posts with caps, rail, chain link fabric, stretcher bars, tension bands, wire ties, truss wire, sleeves, grout, grounding, and all incidentals, complete as shown on the drawings.

PART 86 PIPE SAFETY RAILING, BETWEEN STA. 70+20.000 TO STA. 70+21.000 (Bid Item 0100).

86.1 Measurement

Measurement of Pipe Safety Railing that is provided will be by the linear meter of pipe safety railing constructed as shown on the drawings.

86.2 Payment

Payment for Pipe Safety Railing, Between Sta. 70+20.000 to Sta. 70+21.000 will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for Pipe Safety Railing, including pipe railing and posts, safety chain gates, galvanized anchor bolt assemblies, fabrication, grout or dry pack, surface preparation and painting, and all incidentals, complete.

PART 87 DOUBLE SWING GATES, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0101).

87.1 Measurement

Measurement of double swing gates will be the number of double swing gates acceptably installed.

87.2 Payment.

Payment for Double Swing Gates, Between Sta. 70+34.000 to Sta. 69+80.000 will be made at the applicable contract price, which payment shall constitute full compensation for fabricating and installing the double swing gates, complete, including posts with caps, chain link fabric, frame members, tension bands, truss rods, stretcher bars, wire ties, truss wire, sleeves, hinges, grout, padlocks, and all incidentals, complete, as shown on the drawings.

PART 88 SOIL STABILIZER, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0102).

88.1 Measurement.

Measurement of soil stabilizer will be made on the basis of the actual area in square meters of exposed excavation and fill surfaces in the construction areas treated with soil stabilizer as indicated or directed.

88.2 Payment

Payment for Soil Stabilizer, Between Sta. 70+34.000 to Sta. 69+80.000 will be at the applicable contract price, which payment shall constitute full compensation for the soil stabilizer including materials, processing, hauling, and placing, complete in place.

PART 89 STATION MARKINGS, BETWEEN STA. 70+34.000 TO STA. 69+80.000 (Bid Item 0103).

Payment for Station Markings, between Sta. 70+34.000 to Sta. 69+80.000 will be made at the applicable contract lump sum price, which shall be considered full payment for preparation, paint and marking, equipment and labor.

PART 90 BOX CONDUIT @ BUFFALO DRIVE, STA. 70+20.372 to STA. 70+34.000 (Bid Item 0104).

Payment for Box Conduit @ Buffalo Drive, Sta. 70+20.372 to Sta. 70+34.000 will be made at the applicable contract price, which payment shall constitute full compensation for the box conduit; except earthwork; except removal of existing gabion and existing low flow channel and temporary grouted riprap transition structure; including temporary concrete k-rail

traffic safety barriers that may be required for safety; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, including extended headwalls, complete as shown on the drawings except for pipe safety hand rail, and chain link fencing.

PART 91 GROUTED RIPRAP, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0105)

91.1 Measurement.

Measurement of Grouted Riprap will be made on the basis of the actual volume, in cubic meters, of grouted riprap within the pay lines of the grouted riprap structure as shown on the drawings. Measurement of grouted riprap placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the grouted riprap structure. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meterin cross section. Grouted riprap placed in items of work other than those specifically mentioned above, and grouted riprap and grout and riprap wasted or used for the convenience of the Contractor will not be included in measurement for payment.

91.2 Payment.

Payment for Grouted Riprap, Between Sta. 70+20.372 to Sta. 69+80.000 will be made at the applicable contract unit price, which payment shall constitute full compensation for obtaining and placing the grouted riprap and grout, complete.

PART 92 CABLE SAFETY RAILING, BETWEEN STA. 70+20.372 TO STA. 69+80.000 (Bid Item 0106).

92.1 Measurement

Measurement of Cable Safety Railing will be by the linear meter, measured from end to end, of railing installed as shown on the drawings.

92.2 Payment

Payment for Cable Safety Railing, Between Sta. 70+20.372 to Sta. 69+80.000 will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for railing, including posts, cable, safety chain gates, galvanized appurtenances, fabrication, post sleeves, grout or dry pack, and all incidentals, complete.

PART 93 RESTRICTOR PLATE FOR FLAMINGO DETENTION BASIN OUTLET (Bid Item 0107)

Payment for Restrictor Plate For Flamingo Detention Basin Outlet will be made at the applicable contract unit price, which payment shall constitute full compensation for restrictor plate, including all materials, anchor bolt assemblies, fabrication, grout or dry pack, surface preparation and necessary painting, and all incidentals, complete.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

SUBMITTAL PROCEDURES

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Government-Furnished Information

Submittal register database and submittal management program will be delivered to the contractor, by contracting officer. Register database will have the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-04 Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal. A "G" indicates approval by contracting officer; a blank indicates approval by QC manager.

The database and submittal management program will be extractable from the disk furnished to contractor, for operation on contractor's IBM compatible personal computer with 640kb RAM, a hard drive, and 100 MB Zip Drive.

1.2 DEFINITIONS

1.2.1 Submittal

Shop drawings, product data, samples, operation and maintenance data, and administrative submittals presented for review and approval. Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.2.2 Types of Submittals

All submittals are classified as indicated in paragraph "Submittal Descriptions (SD)". Submittals also are grouped as follows:

a. Shop drawings: As used in this section, drawings, schedules, diagrams, and other data prepared specifically for this contract, by contractor or through contractor by way of subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate portion of work.

b. Product data: Preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate portion of work, but not prepared exclusively for this contract.

c. Samples: Physical examples of products, materials, equipment, assemblies, or workmanship that are physically identical to portion of work, illustrating portion of work or establishing standards for evaluating appearance of finished work or both.

d. Operation and Maintenance (O&M) Data:
Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item. The data is required when the item is delivered to the project site.

e. Administrative submittals: Data presented for reviews and approval to ensure that administrative requirements of project are adequately met but not to ensure directly that work is in accordance with design concept and in compliance with contract documents.

1.3 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Certificates of insurance.
Surety bonds.
List of proposed subcontractors.
List of proposed products.
Construction Progress Schedule.
Submittal schedule.
Schedule of values.
Health and safety plan.
Work plan.
Quality control plan.
Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the contractor for integrating the product or system into the project.

Drawings prepared by or for the contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

As-built drawings.

Special warranties.

Posted operating instructions.

Training plan.

1.3.1 Approving Authority

Person authorized to approve submittal.

1.3.2 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce construction and materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.4 SUBMITTALS

Submit the following in accordance with the requirements of this section.

SD-01 Preconstruction Submittals

Submittal register; G, RE.

1.5 USE OF SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. Use

electronic submittal register program furnished by the Government or any other format. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by government; retain data which is output in columns (a), (g), (h), and (i) as approved.

1.5.1 Submittal Register

Submit submittal register. Submit with quality control plan and project schedule required by Section 01451, "Contractor Quality Control" and Section 01321, "Network Analysis Schedules." Do not change data in columns (c), (d), (e), and (f) as delivered by the government. Verify that all submittals required for project are listed and add missing submittals. Complete the following on the register:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date contractor needs approval of submittal.

Column (i) Contractor Material: Date that contractor needs material delivered to contractor control.

1.5.2 Contractor Use of Submittal Register

Update the following fields in the government-furnished submittal register program or equivalent fields in program utilized by contractor.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.5.3 Approving Authority Use of Submittal Register

Update the following fields:

Column (b).

Column (l) List date of submittal receipt.

Column (m) through (p).

Column (q) List date returned to contractor.

1.5.4 Contractor Action Code and Action Code

Entries used will be as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.5.5 Copies Delivered to the Government

Deliver one copy of submitted register updated by contractor to government with each invoice request. Deliver in electronic format, unless a paper copy is requested by contracting officer.

1.6 PROCEDURES FOR SUBMITTALS

1.6.1 Reviewing, Certifying, Approving Authority

QC organization shall be responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates contracting officer is approving authority for that submittal item.

1.6.2 Constraints

a. Submittals listed or specified in this contract shall conform to provisions of this section, unless explicitly stated otherwise.

b. Submittals shall be complete for each definable feature of work; components of definable feature interrelated as a system shall be submitted at same time.

c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

d. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.6.3 Scheduling

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.

b. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working

days for submittals for QC manager approval and 20 working days for submittals for contracting officer approval. Period of review for submittals with contracting officer approval begins when Government receives submittal from QC organization. Period of review for each resubmittal is the same as for initial submittal.

1.6.4 Variations

Variations from contract requirements require Government approval pursuant to contract Clause entitled "FAR 52.236-21, Specifications and Drawings for Construction" and will be considered where advantageous to government.

1.6.4.1 Considering Variations

Discussion with contracting officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

1.6.4.2 Proposing Variations

When proposing variation, deliver written request to the contracting officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to government. If lower cost is a benefit, also include an estimate of the cost saving. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.6.4.3 Warranting That Variations Are Compatible

When delivering a variation for approval, contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.6.4.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.6.5 Contractor's Responsibilities

a. Determine and verify field measurements, materials, field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and contract documents.

b. Transmit submittals to QC organization in accordance with schedule on approved Submittal Register, and to prevent delays in the work, delays to government, or delays to separate contractors.

c. Advise contracting officer of variation, as required by paragraph entitled "Variations."

d. Correct and resubmit submittal as directed by approving authority. When resubmitting disapproved transmittals or transmittals noted for resubmittal, the contractor shall provide copy of that previously submitted transmittal including all reviewer comments for use by approving authority. Direct specific attention in writing or on resubmitted submittal, to revisions not requested by approving authority on previous submissions.

e. Furnish additional copies of submittal when requested by contracting officer, to a limit of 20 copies per submittal.

f. Complete work which must be accomplished as basis of a submittal in time to allow submittal to occur as scheduled.

g. Ensure no work has begun until submittals for that work have been returned as "approved," or "approved as noted", except to the extent that a portion of work must be accomplished as basis of submittal.

1.6.6 QC Organization Responsibilities

a. Note date on which submittal was received from contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Actions Possible."

(2) When contracting officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is contracting officer, QC organization will certify submittals forwarded to contracting officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number DACW09-02-C-_ _ _ _, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC manager _____, Date _____"
(Signature)

(2) When approving authority is QC manager, QC manager will use the following approval statement when returning submittals to contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number DACW09-02-C-_ _ _ _, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The person signing certifying statements shall be QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

h. Update submittal register database as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by contracting officer.

i. Retain a copy of approved submittals at project site, including contractor's copy of approved samples.

1.6.7 Government's Responsibilities

When approving authority is contracting Officer, the Government will:

a. Note date on which submittal was received from QC manager, on each submittal for which the contracting officer is approving authority.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph entitled "Actions Possible" and with markings

appropriate for action indicated.

1.6.8 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required , does not have evidence of being reviewed and approved by contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by contractor or for being incomplete, with appropriate action, coordination, or change.

b. Submittals marked "approved" "approved as submitted" authorize contractor to proceed with work covered.

c. Submittals marked "approved as noted" or "approval except as noted; resubmission not required" authorize contractor to proceed with work as noted provided contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until resubmittal is approved.

1.7 FORMAT OF SUBMITTALS

1.7.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels, to office of approving authority. Transmit submittals with transmittal form prescribed by contracting officer and standard for project. The transmittal form shall identify contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

1.7.2 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Section number of the specification section by which submittal is required.

d. Submittal description (SD) number of each component of submittal.

e. When a resubmission, add alphabetic suffix on submittal description, for example, SD-10A, to indicate resubmission.

f. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other second tier contractor associated with submittal.

g. Product identification and location in project.

1.7.3 Format for Shop Drawings

a. Shop drawings shall not be less than A4 (297 by 210 mm) nor more than AO (1189 by 841 mm).

b. Present A4 (297 by 210 mm) sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled "Identifying Submittals."

d. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Shop drawing dimensions shall be the same unit of measure as indicated on the contract drawings. Identify materials and products for work shown.

1.7.4 Format for Product Data

a. Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project.

d. Provide product data in metric dimensions. Where product data are included in preprinted catalogues with inch-pound units only, submit metric dimensions on separate sheet.

1.7.5 Format of Samples

a. Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

(1) Sample of Equipment or Device: Full size.

(2) Sample of Materials Less Than 50 by 75 mm: Built up to A4 (297 by 210 mm).

(3) Sample of Materials Exceeding A4 (297 by 210 mm): Cut down to A4 (297 by 210 mm) and adequate to indicate color, texture, and material variations.

(4) Sample of Linear Devices or Materials: 250 mm length or length to be supplied, if less than250 mm. Examples of linear devices or materials are conduit and handrails.

(5) Sample of Non-Solid Materials: 750 ml. Examples of non-solid materials are sand and paint.

(6) Color Selection Samples: 50 by 100 mm.

(7) Sample Panel: 1200 by 1200 mm.

(8) Sample Installation: 10 square meters.

b. Samples Showing Range of Variation: Where variations are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range.

c. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples shall be in undamaged condition at time of use.

d. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

e. When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.7.6 Format of Operation and Maintenance (O&M) Data

a. O&M Data format shall comply with the requirements specified in Section 01781, Operation and Maintenance Data"

1.7.7 Format of Administrative Submittals

a. When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply contractor's approval stamp to document, but to a separate sheet accompanying document.

b. Provide all dimensions in administrative submittals in metric. Where data are included in preprinted material with inch-pound units only, submit metric dimensions on separate sheet.

1.8 QUANTITY OF SUBMITTALS

1.8.1 Number of Copies of Shop Drawings

a. Submit six copies of submittals of shop drawings requiring review and approval only by QC organization and seven copies of shop drawings requiring review and approval by Contracting Officer.

1.8.2 Number of Copies of Product Data

Submit product data in compliance with quantity requirements specified for shop drawings.

1.8.3 Number of Samples

a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to contractor.

b. Submit one sample panel. Include components listed in technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of non-solid materials.

1.8.4 Number of Copies of Operation and Maintenance Data

Submit three copies of O&M Data to the Contracting Officer for review and approval

1.8.5 Number of Copies of Administrative Submittals

a. Unless otherwise specified, submit administrative submittals compliance with quantity requirements specified for shop drawings.

1.9 FORWARDING SUBMITTALS

1.9.1 Samples Required of the Contractor

Submit samples to Contracting Officer.

1.9.2 Shop Drawings, Product Data, and O&M Data

As soon as practicable after award of contract, and before procurement of fabrication, submit, except as specified otherwiae, to the Contracting Officer, the shop drawings, product data and O&M Data required in the technical sections of this specification. The designer for this project will review and provide surveillance for the Contracting Officer to determine if Contractor-approved submittals comply with the contract requirements, and will review and approve for the Contracting Officer those submittals not permitted to be Contractor approved to determine if

submittals comply with the contract requirements. One copy of the transmittal form for submittals shall be forwarded to the Resident Engineer in Charge of Construction

1.10 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.10.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.10.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.11 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.12 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.13 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.14 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those

specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.15 SUBMITTAL REGISTER

At the end of this section is a submittal register showing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Government will provide the initial submittal register in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall track all submittals.

1.16 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

1.17 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms are included in the RMS-QC software that the Contractor is required to use for this contract. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.18 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

1.18.1 Procedures

The Contractor shall complete ENG Form 4025, "Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificate of Compliance," with each set of shop drawings, certificates, equipment data of samples submitted. A blank ENG Form 4025 will be furnished by the Contracting Officer upon request. Six (6) copies of each submittal will be required

1.18.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.19 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.20 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Four copies of the submittal will be retained by the Contracting Officer and two copies of the submittal will be returned to the Contractor.

1.21 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.22 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
UPPER FLAMINGO DIVERSION CHANNEL

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	CLASSIFICATION	GOVT A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01200	SD-01 Preconstruction Submittals															
			Topographic Surveyor	3.18.2	G	RE												
			SD-11 Closeout Submittals															
			3 full size sets of blueline prints marked up to depict as-built conditions	3.14.3														
		01321	SD-01 Preconstruction Submittals															
			Qualifications	1.5	G	RE												
			Standard Activity Coding Dictionary	1.6.2.5														
			Schedule Development Session scheduler/planner	1.7.2	G	RE												
			Preliminary Network Analysis Schedule	1.7.3	G	RE												
			Network Analysis Schedule	1.7.4	G	RE												
			Accepted Network Analysis Schedule	1.7.6	G	RE												
			Summary Network	1.7.8	G	RE												
			SD-07 Certificates															
			Monthly Network Analysis Updates	1.7.7	G	RE												
			SD-11 Closeout Submittals															
			As-Built Schedule	1.7.9	G	RE												
		01330	SD-01 Preconstruction Submittals															
			Submittal register	1.5.1	G	RE												
		01355	SD-01 Preconstruction Submittals															

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01355	Environmental Protection Plan	1.7	G RE													
			Joint Condition Survey Report	1.8	G RE													
		01356	SD-07 Certificates															
			Mill Certificate or Affidavit	2.1.3	G RE													
		01702	SD-11 Closeout Submittals															
			As-built Drawings	3.1.1	G RE													
		02100	SD-01 Preconstruction Submittals															
			Diversion and Control of Water Plan	1.2.1	G RE													
		02300	SD-01 Preconstruction Submittals															
			Excavation Plan	3.1	G RE													
			Excavation Plan	3.1.1	G RE													
			Haul Route Plan	3.7.1	G RE													
			SD-02 Shop Drawings															
			Shop Drawings	3.3	G RE													
			Explosive Storage Location	3.2.8.2	G RE													
			Pre-construction topographic survey of the entire project site	Part 3														
			Pre-construction topographic survey of the entire project site	3.7.2.1														
			Post-construction topographic survey of the entire project site	Part 3														
			Post-construction topographic survey of the entire project site	3.7.2.1														
			SD-05 Design Data															
			Blast Data Report	3.2.2														

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	
		02300	Blast Data Report	3.2.7														
			SD-06 Test Reports															
			Field Density Tests	3.10.1	G RE													
			Treating of Compacted Fill Materials	3.10.1	G RE													
		02316	SD-06 Test Reports															
			Field Density Tests	3.4.3	G RE													
			Testing of Backfill Materials	3.4.2	G RE													
		02380	SD-01 Preconstruction Submittals															
			Source of Stone	1.3.1.2	G RE													
			Testing Laboratory	3.4.1.1	G RE													
			SD-04 Samples															
			Stone Quality	2.1.1.1														
			Bulk Specific Gravity	2.1.1.1														
			SD-05 Design Data															
			Method of Placement	3.1														
			SD-06 Test Reports															
			Gradation Testing	2.1.1.4														
			Daily Report of Operations	3.2														
			SD-07 Certificates															
			Waybills and Delivery Tickets	3.6.1														
			Weigh Scale Certification	3.1.1														
		02500	SD-03 Product Data															
			Composition Requirements	2.1	G RE													
		02510	SD-03 Product Data															
			Installation	3.1	G RE													

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02510	Waste Water Disposal Method	3.2	G	RE												
			Satisfactory Installation	3.5	G	RE												
			SD-06 Test Reports															
			Bacteriological Disinfection	3.3	G	RE												
			Bacteriological Disinfection	3.3.1	G	RE												
			SD-07 Certificates															
			Manufacturer's Representative	1.4	G	RE												
			Installation	3.1	G	RE												
			Meters	2.7.8	G	RE												
		02531	SD-07 Certificates															
			Portland Cement	2.7.1	G	RE												
			Joints	2.3	G	RE												
		02630	SD-03 Product Data															
			Placing Pipe	3.3	G	RE												
			SD-04 Samples															
			Pipe for Culverts and Storm Drains	2.1	G	RE												
			SD-07 Certificates															
			Resin Certification	2.1.8	G	RE												
			Resin Certification	2.1.9	G	RE												
			Pipeline Testing	3.8	G	RE												
			Hydrostatic Test on Watertight Joints	2.7	G	RE												
			Determination of Density	3.7.5	G	RE												
			Frame and Cover for Gratings	2.3.7	G	RE												
		02700	SD-02 Shop Drawings															

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02700	Placing Pipe	3.3	G RE													
			SD-06 Test Reports															
			Pipeline Testing	3.7	G RE													
		02709	SD-04 Samples															
			Filter Material	2.2														
		02722	SD-03 Product Data															
			Plant, Equipment, and Tools	1.6														
			Waybills and Delivery Tickets	3.3	G RE													
			SD-06 Test Reports															
			Sampling and testing	1.4	G RE													
			Field Density Tests	1.4.2.4	G RE													
		02741	SD-01 Preconstruction Submittals															
			Quality Control Plan for hot-mix asphalt	3.9.1	G RE													
			SD-03 Product Data															
			Waybills and Delivery Tickets	3.6.1														
			SD-04 Samples															
			Asphalt Cement Binder	2.2														
			SD-05 Design Data															
			Bituminous Pavement Mix Design	2.3	G RE													
			Job Mix Formula	2.3.1	G RE													
			Properties of Bituminous Pavement Mixture	2.3.1	G RE													
			SD-06 Test Reports															
			Asphalt Content	3.9.3.1														
			Aggregate Gradation	3.9.3.2														

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02741	Aggregate Moisture	3.9.3.3														
			Temperatures	3.9.3.4														
			Moisture Content of Mixture	3.9.3.5														
			Laboratory Air Voids, Marshall	3.9.3.6														
			Stability and Flow															
			In-place Density	3.9.3.7														
			Thickness	3.9.3.8														
			Grade Conformance and Surface	3.9.3.9														
			Smoothness															
			Asphalt Cement Binder	2.2														
			Aggregates	2.1	G	RE												
			QC Monitoring	3.9.3.11	G	RE												
			SD-07 Certificates															
			Testing Laboratory	3.5	G	RE												
			Certification of compliance	3.9.3.11														
			Plant Scale Calibration	1.4														
			Certification															
		02748	SD-06 Test Reports															
			Sampling and Testing	3.7														
			SD-07 Certificates															
			Waybills and Delivery Tickets	3.4	G	RE												
		02821	SD-07 Certificates															
			Chain Link Fence	2.1.1	G	RE												
		03101	SD-02 Shop Drawings															
			Shop Drawings	3.1.1	G	RE												
			Shop Drawings	3.2.3	G	RE												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
UPPER FLAMINGO DIVERSION CHANNEL

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03101	SD-03 Product Data															
			Materials	2.1														
			SD-07 Certificates															
			Shop Drawings	3.1.1	G RE													
			Shop Drawings	3.1.1	G RE													
			Shop Drawings	3.2.3	G RE													
			Shop Drawings	3.2.3	G RE													
			Inspection	3.3														
			Formwork Not Supporting the Weight of Concrete	3.2.1	G RE													
		03151	SD-07 Certificates															
			Premolded Expansion Joint Filler Strips	2.1.1	G RE													
			Compression Seals and Lubricant	2.1.2.2	G RE													
			Field Molded Sealants and Primer	2.1.2.1	G RE													
		03200	SD-02 Shop Drawings															
			Fabrication and Placement	3.1	G RE													
			SD-06 Test Reports															
			Materials	2.1	G RE													
			Tests, Inspections, and Verifications	2.1.1														
		03301	SD-03 Product Data															
			Concrete Mixture Proportioning	2.2														
			Batch Plant	3.1.2														

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03301	Capacity	3.1.1														
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			Conveying Equipment	3.1.4														
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			Concrete Transportation Construction Inspector (CTCI)	3.7.1														
			Construction Joint Treatment	3.2.4	G	RE												
			Curing and Protection	3.5	G	RE												
			Cold-Weather Placing	3.3.4	G	RE												
			Hot-Weather Placing	3.3.5	G	RE												
			Finishing	3.4	G	RE												
			SD-04 Samples															
			Aggregates	1.3.1.1	G	RE												
			Cementitious Materials, Admixtures, and Curing Compound	1.3.1.2	G	RE												
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			Mixer Uniformity	3.7.2.13														
			Test Results and Inspection Reports	3.7														
			SD-07 Certificates															
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			Chemical Admixtures	2.1.3														

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03301	Membrane-Forming Curing Compound	2.1.4.1														
			Epoxy Resin	2.1.8														
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EARTHWORK

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SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1	(1996) Safety and Health Requirements Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4914	(1994) Density of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.
ASTM D 5030	(1994) Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Plan; G, RE.

The Contractor shall submit his excavation plan to the Contracting Officer in conformance with paragraph EXCAVATION PLAN

Haul Route Plan; G, RE.

The Contractor shall submit a haul route plan for removal of required excavated materials and for placing required fill materials.

SD-02 Shop Drawings

Shop Drawings; G, RE.

The contractor shall submit for approval shop drawings showing the proposed method of bracing which he intends to use to protect existing property.

Explosive Storage Location; G, RE.

The contractor shall submit to the Contracting Officer drawings showing the location, access to and type of construction of the proposed storage magazine for explosives, and cap house.

Pre-construction topographic survey of the entire project site.

The contractor shall submit to the Contracting Officer pre-construction surveys of the entire project site shown on the drawings.

Post-construction topographic survey of the entire project site.

The contractor shall submit to the Contracting Officer post-construction surveys of the entire project site for each of the compacted fill work and the stockpiled filled work shown on the drawings.

SD-05 Design Data

Blast Data Report.

The Contractor shall submit Pre- and Post-Blast Reports which shall contain all of the pertinent data on the location by station, ground surface elevation in the area of the blast; diameter, spacing, depth, over-depth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives to be used and actually used per hole and per blast; the sequence and pattern of delays, and

description and purpose of special methods.

SD-06 Test Reports

Field Density Tests; G, RE.

Treating of Compacted Fill Materials; G, RE.

Copies of all laboratory and field test reports shall be submitted to the Contracting Officer on approved forms within 24 hours of the completion of the tests.

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 DEFINITION OF UNSATISFACTORY MATERIALS

Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris and materials classified in ASTM D 2487, as Pt, OH, OL, CH, MH, and materials too wet to support construction equipment.

PART 2 PRODUCTS

2.1 SOIL STABILIZER PRODUCT

The dust palliative/soil stabilizer shall be a mixture of plaster and natural fiber mulch. The cellulose fiber mulch shall be produced from grinding clean whole wood chips, or fiber produced from ground newsprint with a labeled ash content not to exceed 7 percent. The plaster shall consist of naturally occurring high purity processed gypsum and additives. The gypsum shall be produced from a mined or quarried source. The gypsum shall be processed to be composed of crushed dry calcium sulfate hemihydrate having a purity of not less than 88 percent. The shipping invoices for the gypsum shall state the gypsum's purity content, dry weight, and source of manufacture. Processed gypsum that has become partially air set, lumpy, or caked shall not be used. The Contractor shall add a color pigment to the dust palliative/soil stabilizer slurry at the time of application. Apply color pigment to match existing soil color at the site, at the application rate recommended by the manufacturer. Color can be matched using the "Davis Colors" chart by Soil-Tech, Las, Vegas, Nevada, or equal. The gypsum and additives shall be furnished either in bags or bulk and be accompanied by bills of lading and shipping invoices. The plaster/cellulose fiber mulch shall be applied at a rate of 6.75 tonnes of plaster mixed with 2.242 tonnes of fiber per hectare.

PART 3 EXECUTION

Prior to the start of construction work (including clear site and remove obstructions, the Contractor shall conduct a pre-construction topographic survey of the entire project site in accordance with Section 01200 GENERAL REQUIREMENTS paragraph CONTRACTOR'S SURVEYS.

At the end of all work associated with this section, the Contractor shall conduct a post-construction topographic survey of the entire project site in accordance with Section 01200 GENERAL REQUIREMENTS paragraph CONTRACTOR'S SURVEYS.

3.1 EXCAVATION, GENERAL

Excavation shall consist of the removal of every type of material encountered in the designated areas or from areas directed. The material to be removed may include but is not limited to hardpan, silt, sand, gravel, cobbles and boulders, cemented silt/sand/gravel/cobbles/boulders with various degrees of cementation, caliche, asphalt, vegetation, trash, and other debris. Slope lines indicated on the drawings for temporary cuts do not necessarily represent the actual slopes to which the excavation must be made to safely perform the work. Unforeseen conditions may dictate that the temporary cut slope shall be made to the actual slope to which the work can be safely performed. Measurement and payment for excavation will be made in accordance with Section 01270. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation will likely require ripping or other rock-excavation techniques, which may include blasting, and shall be performed in a manner which will not impair the subgrade. Use of heavy tractors equipped with a ripper tooth, hoe-rams, and hydraulic or pneumatic rock breaker could be necessary to excavate highly cemented soils. Rock or cemented material from required excavation to be used in compacted fills and backfills shall be crushed or otherwise reduced in size to meet gradation requirements prior to placement or stockpiling. Except as otherwise specified, the finish surface of subgrades shall be smooth and shall not vary more than 25 mm from indicated grade, except at areas to receive concrete where finished surfaces of subgrade shall not vary more than 12.5 mm from indicated grade. Prior to commencing excavation, the Contractor shall submit his Excavation Plan to the Contracting Officer. All subgrade excavations will be inspected by the Contracting Officer prior to placement of any fill materials.

3.1.1 Excavation Plan

Prior to commencing excavation, the Contractor shall submit his plan for excavation to the Contracting Officer for acceptance. The plan must show all proposed locations of excavation operations utilizing methods involving blasting, headache balling, hoe ramming, or other techniques as may be applicable. In addition, the plan must include the results of a pre-excavation survey, a detailed blasting plan (if applicable) performed by a certified blasting consultant, and a seismic monitoring plan. The excavation plan shall be updated and resubmitted to the Contracting Officer any time the Contractor proposes altering his methods. The Contractor's methods for excavation are solely his responsibility. Approval of the excavation plan by the Contracting Officer will in no way limit the Contractor's liability regarding property damaged by this operations, nor will it alter the Contractor's sole responsibility for the safety of his operations. The Contractor shall be responsible for all damage caused by his excavation operations and be responsible for answering all complaints. The Contractor shall provide the Contracting Officer with 30 days advance warning of the use of excavation techniques which may lead to property

damage to allow for review of the proposed techniques, to confirm general compliance with these specifications, and to allow monitoring of the excavations methods.

3.2 EXCAVATION, BLASTING

Any method used to excavate the structure or channel using explosives shall be subject to the approval by the Contracting Officer.

3.2.1 General Requirements

The drilling and blasting program and methods shall be the minimum necessary to break up the rock and/or caliche/cemented alluvium into bulldozer-manageable sized pieces for removal. Only the minimum strength explosive that will accomplish the fracturing will be allowed. If multiple charges are deemed necessary, they will be sequenced to produce good breakage of the rock or caliche/cemented alluvium and reduce airblast (sonic impacts) and ground vibrations to minimal levels. In the design of the blasting pattern, no blastholes will be permitted within 60 meters of an active tortoise or Gila Monster burrow. A qualified desert tortoise ecologist is required to be present during all blasting operations to ensure that there are no occupied burrows and/or to remove tortoises or Gila Monsters from the surface or burrows within the 60 meter limit. The desert tortoise ecologist will provide a short report with field notes to the Contracting Officer. The desert tortoise ecologist will be provided by the Contractor as his own expense. Additional restrictions may be imposed during the hibernation period (15 November through 15 March) to protect hibernating tortoises, if necessary and directed by the Contracting Officer. The Contractor shall strictly comply with all State and local regulations regarding construction blasting (e.g., Uniform Standard Specifications for Public Works Construction Off-Site Improvements, Clark County Area, Nevada, Third Edition, subsections 107.10, 203.03.03, and 208.03.01, and Engineer Manual (EM) 1110-2-3800, including all notice and reporting requirements). Under no circumstances shall blasting be performed within 30 meters of concrete that has been placed less than seven days. Blasting within 30 meters of concrete older than seven days will be permitted only if approved by the Contracting Officer.

3.2.2 Blasting

Prior to drilling for each blast, the Contractor shall submit a Pre-Blast data report plan on an approved form, which includes the pertinent data on the location by station, ground surface elevation in the area of the blast; diameter, spacing, depth, overdepth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives used per hole and per blast; the sequence and pattern of delays, and description and purpose of special methods. The loading of holes shall be done in the presence of a Government inspector. Acceptance by the Contracting Officer of the Pre-Blast data report plan will not relieve the Contractor of his sole responsibility to produce satisfactory results as set forth in these specifications. Drilling and blasting shall be done only to the depth, amount, and at such locations, with explosives of such quantity, distribution and density that will not produce unsafe or damaged rock and/or caliche/cemented alluvium surfaces or damage beyond the

prescribed excavation limits. When a drilling and blasting program results in damage to the excavation, or to natural or man-made features, or is injurious to wildlife and habitat, the Contractor will be required to devise and employ methods which will prevent such damage. The revision may include special methods such as presplit and zone blasting, shallow lifts, reduction in size of individual blasts, small diameter blast holes, closely spaced blast holes, reduction of explosives, greater distribution of explosives by use of decking and primacord or variation in density of explosives.

3.2.2.1 Blasting Nearby Structures and Utility Lines

Blasting will not be permitted close to the existing structures and utility lines. Contractor shall use other rock excavation techniques, and deploy all means necessary to break-out and remove layers of highly cemented soils nearby the structures and utility lines. Contractor shall coordinate with utility owners prior to excavation and blasting in the vicinity of utility lines.

3.2.3 Overshooting

The Contractor shall use controlled blasting techniques so as not to overshoot. All possible care shall be exercised in drilling and blasting operations to prevent formation of discontinuities and to minimize over-break and blast damage of adjacent unexcavated ground and structures. Any material outside the authorized limits which may be shattered or loosened because of blasting shall be removed and/or re-compacted by the Contractor at his expense. Shattered or loosened material below the bottom limits of the required excavation shall be uniformly distributed and compacted or otherwise disposed of in a manner satisfactory to the Contracting Officer. The Contractor shall discontinue any method of blasting which leads to overshooting or is dangerous to the public, destructive of natural or man-made features, or is injurious to wildlife and habitat.

3.2.4 Pre-excavation Survey

The Contractor shall perform a pre-excavation survey which shall include as a minimum; detailed examination of adjacent structures, including video taping and installation of crack monitoring tape along existing structural cracks. Also included shall be a seismic survey performed by a certified seismic survey firm to determine limiting charge weights, distances to structures, ect. for all areas where blasting is proposed and limiting ball weights, height of drop, etc., for all areas where headache balls and/or hoe ram techniques are proposed.

3.2.4.1 Vibration Monitoring

During construction, the Contractor shall hire a certified seismic survey firm to perform a seismic monitoring program to determine the effects of any blasting, headache ball or hoe ram use, or any other specialized excavation technique. Particle velocities measured at an existing structure or 300 meters from the blasting, which ever is closest, shall not exceed statutory limits or 12.5 millimeters per second (whether the result

of blasting or other excavation technique). In addition to these requirements, the Contractor shall provide suitable vibration monitoring equipment to measure and record ground motions at the 60 meter distance.

3.2.5 Notifications

The Contractor shall notify each property owner and public utility company having structures or facilities in proximity to the site of the work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury. Any blasting adjacent to or crossing existing utilities shall be fully coordinated with the owner of the effected utility to include hole spacing, loading and vibration.

3.2.6 Qualifications

During blasting operations, the Contractor shall have on site, and in immediate charge of the blasting, a licensed blaster acceptable to the Contracting Officer who has had no less than 3 years of experience in controlled blasting and rock excavation operations. Powder handlers shall have had no less than one year continuous experience in preparation and loading of powder charges.

3.2.7 Post-Blast Data Reports

In addition to the reporting requirements required above, a separate Post-Blast Data Report of each blast shall be prepared and furnished to the Contracting Officer on an approved form. The report shall indicate the location of the blast by specific stationing, ground surface elevation, depth of round, pounds of explosives used by type and grade, total number of loaded holes, total pounds per delay, quantity and kind of explosive in each hole, maximum measured blast vibration, and all other blast information directed by the Contracting Officer. Original or legible copies of the report shall be provided to the Contracting Officer within 24 hours of the blast event.

3.2.8 Explosives

3.2.8.1 Safety

The contractor shall fully comply with Section 29, Blasting, COE EM 385-1-1 and any Local or State Laws and Regulations applicable to the proposed Blasting Plan.

3.2.8.2 Storage

The Contractor shall submit to the Contracting Officer, for approval, drawings showing the explosive storage location, access to and type of construction of the proposed storage magazine for explosives, and cap house. The explosives storage magazine and other facilities may be located on project lands if a satisfactory location can be found and is approved by the Contracting Officer. The Contractor shall maintain the explosive storage area at his own expense. The explosives storage magazine shall be securely locked when not in use.

3.3 PRESERVATION OF PROPERTY

All excavation operations shall be conducted in such a manner that concrete structures, embankments, utilities, or other facilities and improvements which are to remain in place permanently will not be subjected to settlement or horizontal movement. The Contractor shall furnish and install sheet piling, cribbing, bulkheads, shores, or whatever means may be necessary to adequately support material carrying such improvements or to support the improvements themselves and shall maintain such means in position until they are no longer needed. Temporary sheet piling, cribbing, bulkheads, shores or other protective means shall remain the property of the Contractor and when no longer needed shall be removed from the site. The Contractor shall submit for approval shop drawings showing proposed method of bracing which he intends to use. All shoring and bracing shall be designed so that it is effective to the bottom of the excavation, and shall be based upon calculation of pressures exerted by (and the condition and nature of) the materials to be retained, including surcharge imparted to the side of the trench by equipment and stored materials. Removal of shoring shall be performed in such manner as not to disturb or damage the finished concrete or other facility.

3.4 EXCAVATION FOR STRUCTURES

Excavation within the vicinity of existing structures, utilities, roads, and drainage pipes to remain in place shall be performed in a manner to prevent damage to the structure. Earth banks and facilities to remain in place shall be supported as necessary during excavation. Potential for damage resulting from severe vibration may limit the Contractor's operations or choice of equipment. In general, unless otherwise shown or specified, the actual side slopes shall be in accordance with COE EM 385-1-1.

3.5 EXCAVATION CHANNEL

Channel excavation consists of the removal of all materials within the lines and grades indicated.

3.6 REMOVAL OF UNSATISFACTORY MATERIALS

The removal of unsatisfactory materials which are unsatisfactory for the foundation of the channel, or other structures, may be required in certain areas. For definition of unsatisfactory materials see paragraph: DEFINITION OF UNSATISFACTORY MATERIALS. Channel subgrade materials that cannot be brought to 95% compaction after scarification, shall be removed. The Contractor will be required to excavate any such areas to the depth directed and backfill the removal areas with compacted fill conforming to the requirements of Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS.

3.7 DISPOSITION AND DISPOSAL OF EXCAVATED MATERIALS

Excavated materials originating from the construction of the Upper Flamingo Diversion Channel suitable for required fills shall be used directly in the work, or if not immediately utilized shall be placed in temporary

stockpiles for further processing, hauling, handling, and then used directly as compacted fill in portions of the work as scheduled by the Contractor. See also Section 01200 GENERAL REQUIREMENTS paragraph DISPOSAL SITE and paragraph DISPOSAL SITES.

Satisfactory excavated natural ground and surface material and soils not immediately utilized as part of the construction shall be hauled and either temporarily stockpiled as necessary at the TEMPORARY DISPOSAL SITE between Sta. 61+40.000 to Sta. 57+40.000 as shown on drawing WORK LIMITS (drawing sheet T4) or temporarily stockpiled as necessary within TCE limits at the fill area between Sta. 49+20.000 to Sta. 42+00.000 as shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000, with the exception that the Contractor shall note that construction entry into a portion of the fill area shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 is limited by OPTION ITEM No. 1. Any stockpile shall be placed in a manner to preclude ponding of water.

The Contractor shall process the stockpiled material as necessary and haul and utilize the material as compacted fill to the lines and grades in the fill area shown on drawing GRADING PLAN, STA. 49+20.000 TO 42+00.000 (drawing sheet C27), with the exception that the Contractor shall note that construction entry into a portion of the fill area shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 is limited by OPTION ITEM No. 1.

Materials and soils that the Contractor places in the disposal site shown in the drawing GRADING PLAN, STA 49+20.000 TO 42+00.000 (drawing sheet C27) shall be satisfactory excavated material and satisfactory excess excavated material originating from the construction of the Upper Flamingo Diversion Channel and shall be free from trash, dumped debris and demolition products, and shall consist of no materials and soils suspected of having characteristics of hazardous and/or toxic waste materials characterized as unsatisfactory soil and material including trash, dumped debris and demolition products, and shall meet the requirements of paragraph DISPOSAL SITE - STA. 49+20.000 TO STA. 42+00.000 of this section. Materials and soils suspected of having characteristics of hazardous and/or toxic waste materials characterized as unsatisfactory soil including trash, dumped debris and demolition products and unstable soils shall become the property of the Contractor and shall be removed from the project site in accordance with the requirements Section 01355 ENVIRONMENTAL PROTECTION and Section 01200 GENERAL REQUIREMENTS. No excavated material or waste of any kind shall be removed beyond the project limits under this contract without the express written authority of the Contracting Officer, or as allowed under the contract. Prior to placing satisfactory material and satisfactory excess material, the approved stockpile area and disposal site shall be cleared of trash and vegetation. Vegetation shall be removed by grading the existing ground surface to a depth of 150 mm. Any stockpile shall be placed in a manner to preclude ponding of water. The disposal site shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 shall be graded and filled as per plan and in accordance with paragraph DISPOSAL SITE - STA. 49+20.000 TO 42+00.000 of this section. Natural ground and surface soils and materials thus excavated and removed will then be designated as either:

i. Materials to be salvaged, or

ii. Scrap and unsatisfactory materials and soils and unstable materials and soils to be treated as specified above and in Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS.

3.7.1 Hauled Excavated Material

The Contractor shall develop a haul route plan for haul within the project limits, including removal of required excavated materials and placing fill materials and hauling of excavated material and excess excavated material, that utilizes the drawings provided. The haul route plan shall be submitted to the Contracting Officer for approval. Haul routes for transport of the excavated material and excess excavated material shown on the drawing sheets are approximate. See Section 01200 GENERAL REQUIREMENTS for additional requirements and information on excavated material haul routes. The Contractor shall be responsible for obtaining all permits and licenses necessary to haul material off-site. The Contractor will provide to the Contracting Officer three copies of the proposed street haul route plan for transport of all excavated material and excess excavated material.

3.7.2 DISPOSAL SITE - STA. 49+20.000 TO 42+00.000

The Contractor shall dispose of satisfactory excavated material and satisfactory excess excavated material originating from the construction of the Upper Flamingo Diversion Channel in the disposal site shown on drawing GRADING PLAN, STA. 49+20.000 TO 42+00.000.

3.7.2.1 General - Disposal Site - Sta. 49+20.000 to 42+00.000

Excavated satisfactory material and excess excavated satisfactory material from the Upper Flamingo Diversion Channel may be temporarily stockpiled, processed as necessary, graded and compacted to the grade and lines as shown on the drawing GRADING PLAN, STA. 49+20.000 TO 42+00.000 (drawing sheet C27).

Material may be temporarily stockpiled at the TEMPORARY DISPOSAL SITE between Sta. 61+40.000 to Sta. 57+40.000 as shown on drawing WORK LIMITS (drawing sheet T4) or temporarily stockpiled as necessary within TCE limits at the fill area between Sta. 49+20.000 to Sta. 42+00.000 as shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000, with the exception that the Contractor shall note that construction entry into a portion of the fill area shown on drawing GRADING PLAN, STA. 49+20.000 TO STA. 42+00.000 is limited by OPTION ITEM No. 1. Any stockpile shall be placed in a manner to preclude ponding of water.

The material shall be processed as necessary to meet the size requirements of paragraph: FILL MATERIAL FROM EXCESS EXCAVATED MATERIAL FOR DISPOSAL SITE - STA. 49+20.000 TO 42+00.000. Compacted fills in the DISPOSAL SITE - STA. 49+20.000 TO 42+00.000 shall be placed and compacted in accordance with paragraph: PLACEMENT OF EXCESS EXCAVATED MATERIAL IN DISPOSAL SITE - STA. 49+20.000 TO 42+00.000 and paragraph: COMPACTION OF EXCESS EXCAVATED MATERIALS IN DISPOSAL SITE - STA. 49+20.000 TO 42+00.000.

Prior to hauling excess excavated material to the DISPOSAL SITE - STA. 49+20.000 TO 42+00.000, the Contractor shall have submitted a

pre-construction topographic survey of the entire project site with 0.5 meter contour intervals. Upon completion of the compacted fill earthwork within the DISPOSAL SITE - STA. 49+20.000 TO 42+00.000 and all other earthwork, the Contractor shall submit a post-construction topographic survey of the entire project site with 0.5 meter contour intervals for the compacted fill work. All surveys shall be in accordance with the requirements of Section 01200 GENERAL REQUIREMENTS, paragraph : CONTRACTOR'S SURVEYS.

3.7.2.2 Preparation for Placing in Disposal Site - Sta. 49+20.000 to 42+00.000

The foundation for the compacted fill to be placed shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Unsatisfactory or unstable (too wet) material and soils not meeting the requirements for fill material shall be removed where directed. The existing surfaces for the compacted fill at the disposal site shall be scarified to a depth of 150 mm, moisture conditioned and proofrolled by four passes of the compaction equipment.

3.7.2.3 FILL MATERIAL FROM EXCAVATED MATERIAL FOR DISPOSAL SITE - STA. 49+20.000 TO 42+00.000

Excavated material including rocks and cemented soils shall be hauled directly from Upper Flamingo Diversion Channel excavation sites or from the TEMPORARY DISPOSAL SITE shown on drawing WORK LIMITS (drawing sheet T4) to the Disposal Site - Sta. 49+20.000 to 42+00.000, processed as necessary by breakdown, crushing or otherwise reduced in sizes with 85% of material to be less than 150 mm (6 inches) in maximum dimension and consisting of at least 40% (by weight of the 150 mm (6 inch) minus material) of material finer than 19 mm (3/4 inch) in size, and then utilized as compacted fill in accordance with grading and compaction requirements of the drawing GRADING PLAN, STA. 49+20.000 TO 42+00.000 (drawing sheet C27) and paragraph: PLACEMENT OF EXCAVATED MATERIAL IN DISPOSAL SITE - STA. 49+20.000 TO 42+00.000, and with paragraph: COMPACTION OF EXCAVATED MATERIALS IN DISPOSAL SITE - STA. 49+20.000 TO 42+00.000.

3.7.2.4 PLACEMENT OF EXCAVATED MATERIAL IN DISPOSAL SITE - STA. 49+20.000 TO 42+00.000

Excavated material placed as compacted fill in the disposal site shall be placed with suitable equipment in horizontal layers which before compaction (loose material), shall not exceed 200 mm (8 inches) in depth for rubber-tired or vibratory rollers or tamping rollers. The Contractor may vary the layer thickness within this limit for the most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking any existing and/or new concrete structures and to prevent the formation of voids.

3.7.2.5 COMPACTION OF EXCAVATED MATERIALS IN DISPOSAL SITE - STA. 49+20.000 TO 42+00.000

Each layer of compacted fill in the disposal site - Sta. 49+20.000 to

42+00.000 shall be compacted to not less than 95 percent of minimum density, per ASTM D 1557. The Contractor shall perform additional compaction requirements such as control and moisture content of the excavated materials in accordance with the applicable portions of paragraph: GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS.

3.8 OVERCUT

Except as otherwise specified or specifically ordered in writing, any overcut or excavation beyond the lines and grades indicated in the plans (or as directed) shall be backfilled with compacted fill conforming to the Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS, or concrete conforming to the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE. Subgrades shall be prepared in accordance with paragraph SUBGRADE PREPARATION. The Contractor shall expect to overbuild and trim back the compacted fill required to backfill overcuts made at trapezoidal channel sections. All excavating, backfilling, compacting of backfill, and concreting occasioned thereby shall be by the Contractor at no additional cost to the Government. Any overcut under existing or newly constructed channels and structures shall be backfilled with concrete.

3.9 COMPACTION EQUIPMENT

Compaction shall be accomplished by tamping roller, rubber tired roller vibratory compactor or mechanical tampers. All equipment, tools, and machines shall be maintained in satisfactory working condition at all times. Compaction equipment shall be suitable for consistently producing uniform soil densities.

3.10 GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS

3.10.1 Control

Moisture-density relations shall be established by the Contractor. The soil used for each maximum density test shall be classified in accordance with ASTM D 2487 and shall include a particle size analysis in accordance with ASTM D 422. At least one five point maximum density test shall be made for every 10 field density tests. Field density test shall be performed by the Contractor at the frequency established in paragraph Field Control, and in such locations to insure that the specified density is being obtained. Moisture-density relations and field densities shall be reported on approved forms. One copy of density data less dry weight determinations shall be provided on the day each test is taken. The completed field density tests report shall be provided with the Contractor Quality Control Report on the work day following the test. All data related to the treating of compacted fill materials shall be submitted to the Contracting Officer on approved forms within 24 hours of the completion of the tests.

3.10.1.1 Laboratory Control

Moisture-density relations shall be established by the Contractor. One moisture-density relation shall be made for each classification, blend or change in classification of soil materials encountered. Approval of

moisture-density relations shall be obtained prior to the compacting of any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with ASTM D 1557.

a. The desired amount of mixing water will be added for each compaction test specimen, mixed well, and the mixture will be placed in a container with an airtight cover and allowed to cure for 24 hours. A shorter curing time may be allowed where tests show that shortening the curing time will not affect the results.

3.10.1.2 Field Control

Field in-place density shall be determined in accordance with ASTM D 1556. The field moisture content shall be determined in accordance with ASTM D 2216. Determination of in-place densities using the nuclear method ASTM D 2922 may be used to supplement the sand cone density tests ASTM D 1556. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. When material contain considerable amount of rock or coarse gravel in-place density test method ASTM D 4914 or ASTM D 5030 shall be used. At least one adjacent sand cone test shall be performed for every five nuclear density tests performed. If field density tests determined by the nuclear method vary by more than 0.1 kilonewtons per cubic meter from comparison sand-cone tests, and are consistently high or low, adjustment of the calibration curve is necessary.

a. In-Place Densities

(1) One test per 750 cubic meters, for the first 7,500 cubic meters of material and one test for each 1,500 cubic meters thereafter, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by other than hand-operated machines. At least one test shall be made in each 600 mm layer of compacted fill or backfill processed as a unit and not less than one test shall be made in each area. One test per 300 cubic meters, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines. The contractor CQC shall maintain a log of all tests, which will, updated and submitted to the contracting officer on a weekly basis. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, elevation, weight of wet soil, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, soil classification, in-place density test methods either sand-cone or nuclear densimeter.

(2) One test per 400 cubic meters, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines. The Contractor CQC shall maintain a log of all tests which will updated and submitted to the Contracting Officer on a weekly basis. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, weight of wet soil, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, soil classification, in-place density test methods either sand-cone or nuclear densimeter.

3.10.2 Settling of Fills or Backfills with Water

Settling of fills or backfills with water will not be permitted.

3.10.3 FILL MATERIAL

Fill material shall be obtained from the required excavation. Materials considered unsatisfactory for use as compacted fill include but are not limited to those materials containing roots and other organic matter, trash, debris, chunks or clumps of cemented material. Materials classified in ASTM D 2487 as MH, CH, Pt, OH, and OL are also considered unsatisfactory for use as compacted fill. Satisfactory fill material shall contain no stone whose greatest dimension is more than 3/4 the lift thickness. The Contractor shall expect to break-down, crush or otherwise process required excavation material for use as fill material due to the cementation of in-situ soils.

Material for compacted fill behind concrete structures, channel walls, and around box culverts shall contain less than 30 percent by weight passing the .075 mm sieve and shall contain no particle larger than 76 mm.

3.10.4 Placement

Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 17.2 megapascals when tested in accordance with the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE. Fill shall not be placed over covered channels (roof decks) until the concrete has obtained 70% of the contract required design strength. Heavy equipment shall not be operated over pipes and buried structures until at least 600 mm of fill material have been placed and compacted over them. Material from the top of the pipe or buried structure to 600 mm above pipe or buried structure shall be compacted by mechanical tampers or other equipment approved by the Contracting Officer. Compacted fill shall be placed with suitable equipment in horizontal layers which before compaction, shall not exceed 300 mm in depth for rubber-tired or vibratory rollers, 200 mm in depth for tamping rollers, 100 mm in depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.10.5 Moisture Content

Material shall have a uniform moisture content while being placed and compacted. Water shall be added at the source, if required, or by sprinkling each layer of material during placement. Uniform distribution of moisture shall be obtained by disking, harrowing, or otherwise manipulating the soil during and after time water is added. Material containing an excess of moisture shall be manipulated with suitable implements to facilitate maximum aeration and shall be permitted to dry to the proper consistency before being compacted. Fill shall have a maximum moisture content of not more than 2 percent above optimum and a minimum

moisture content of not less than 2 percent below optimum.

3.10.6 Compaction

No layer of fill shall be compacted before the practicable uniform moisture content has been obtained. Scarified areas shall be compacted as specified for the fill placed thereon. Rollers will not be permitted to operate within 300 mm of channel or structure walls or over buried structures until the compacted fill over the top of the structures has reached a depth of 600 mm. Compaction equipment shall be so operated that structures are not damaged nor overstressed during compaction operations. Mechanical tampers shall be used for compaction of fill material adjacent to structures where rolling equipment is impracticable for use in compaction.

3.11 COMPACTED FILL, CHANNEL

3.11.1 Invert

3.11.1.1 Preparation for Placing

The foundation for the compacted fill to be placed shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Unsatisfactory or unstable (too wet) material and soils not meeting the requirements for fill material shall be removed where directed. The existing surfaces for the compacted fill at the channel site shall be scarified to a depth of 150 mm and proofrolled by four passes of the compaction equipment. The subgrade for the channel shall be prepared in accordance with paragraph SUBGRADE PREPARATION.

3.11.1.2 Compaction

Each layer of the material shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557.

3.11.2 Behind Channel Walls

3.11.2.1 Limitations on Equipment

The gross weight of any piece of equipment, or the combined weight of any combinations of equipment coupled together, used to place, moisten and/or compact fill behind channel walls and up to 600 mm above the top of covered sections shall not exceed 16,000 kilograms, including dynamic forces produced by vibratory equipment. Equipment used to compact the fill behind the channel walls shall be of such size as to be capable of operating in the area between the cut slope and the channel wall. Compaction equipment will not be required to operate at elevations lower than 600 mm above the top of wall footings. This equipment shall be of such size as to be capable of operating in the area between the cut slope and the channel wall at any point 600 mm above the top of the heel of wall footings.

3.11.2.2 Construction Balance

Fills behind wall on one side of the channel shall not exceed by more than

1.5 meters the height of the fill behind the opposite channel wall at any time during construction (except restricted by design).

3.11.2.3 Compaction

Each layer of fill behind channel walls, shall be compacted to not less than 90 percent of maximum density, per ASTM D 1557. The top 300 mm of the maintenance road adjacent to the channel wall shall be compacted to not less than 95 percent of maximum density per ASTM D 1557.

3.11.2.4 Trimming

The top of fill adjacent to channel walls shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 25 mm. Any material loosened by trimming shall be recompacted and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a uniform alignment at the top of the berm and reasonably uniform slope at or outside the lines shown on the drawings.

3.11.2.5 Backfill Against Plywood at Ends of Pipe and Sewer Stubs

Plywood shall be braced or otherwise held flush against the end of the pipe during backfilling. The Contractor shall make sure the plywood is of sufficient size to adequately cover the pipe or sewer stub opening. The Contractor shall attach blocks or shims to roughly fit the inside diameter of the pipe to assure that the plywood is not displaced during backfilling.

3.11.3 Compacted Fill Over Covered Channel

3.11.3.1 General

No fill material shall be placed over the top of the covered channel until all voids at the sides of the covered channel have been filled as described below, and until all caved material has been compacted to the specified density to the top of the roof slab.

3.11.3.2 Material

Materials for filling voids shall be clean sand, free of trash, organic materials, debris, and with 100 percent passing the 4.75 mm sieve and not more than 10 percent passing the 150 mm sieve.

3.11.3.3 Placement

The first layer of fill over the concrete box section shall be 300 mm in thickness and shall be compacted with a rubber-tired or vibratory roller having a maximum weight if 9,000 kilograms. The remainder of the fill shall be deposited in 150 mm layers and compacted with rubber-tired or vibratory rollers, or other approved equipment with a maximum weight of 9,000 kilograms until the structure has a cover of at least 600 mm. The remainder of the compacted fill shall be placed as specified in paragraph COMPACTED FILL, CHANNEL of this section.

3.11.3.4 Contractors Option

If the Contractor elects to leave the inside forms and shoring in place, permission will be granted to place fill material 48 hours after concrete has been placed.

3.11.3.5 Compaction

Each layer of fill on top of the covered channel shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557. Compacted Fill under streets and maintenance roads shall be compacted per paragraph COMPACTED FILL, ROADWAY.

3.11.4 Compacted Fill, Roadway

3.11.4 Compaction

Fill shall be compacted to not less than 95 percent of maximum density per ASTM D 1557 for the width of all traveled ways plus 1 meter on each side thereof.

3.11.4.2 Trimming

All street and maintenance road shoulders and side slopes shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 25 millimeters. Any material loosened by trimming shall be recompacted and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a reasonably uniform slope at or outside the lines shown on the drawings.

3.12 BACKFILL

3.12.1 Structural Backfill

3.12.1.1 Location

Backfill shall consist of all fill against and/or around structures, except compacted fill, channel.

3.12.1.2 Material

Backfill material shall be obtained from the required excavation as approved by the Contracting Officer. In general, the best material available will be designated as backfill and fill about structures. Backfill may consist of sand, gravelly sand, and silty sands. Organic material, silt, clay, broken concrete or pavement, boulders and other unsatisfactory material shall not be used. Backfill for structures shall not contain any stones larger than 75 mm.

3.12.1.3 Placing

Backfill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 17.2 megapascals when tested in accordance with Section 03301 CAST-IN-PLACE

STRUCTURAL CONCRETE.

3.12.1.4 Compaction

Compaction shall be not less than 95 percent of maximum density, per ASTM D 1557 unless noted or shown otherwise.

3.13 SUBGRADE PREPARATION

3.13.1 Subgrade for Channel

Subgrade preparation for channel shall include subgrade preparation for areas to receive concrete, aggregate base course and/or bituminous paving for streets, access roads, maintenance roads, turnarounds, and invert access ramps. All trash and debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. After the channel has been excavated to rough grade, the entire channel invert, invert access ramp, and other area indicated above shall be scarified to a depth of 0.15 meters, moisture conditioned and proofrolled by 4 passes of the compaction equipment and trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subgrade ready to receive concrete. If the subgrade is disturbed by the Contractor's operations or is overexcavated, or is soft or yielding, the subgrade shall be restored to grade and compacted to a density of 95 percent of maximum density, per ASTM D 1557. The finished surface of the subgrade shall not be more than 13 mm above the indicated grade at any point when tested with a 3 meters straightedge.

3.14 SOIL STABILIZER

All exposed excavation and fill surfaces and disturbed surface areas in the project area not covered by concrete or asphalt or landscaping work including revegetation shall be treated with a soil stabilizer for soil stabilization and dust control with the concentrations stated in paragraph SOIL STABILIZER PRODUCT after construction is completed. The soil stabilizer shall be watered in per the manufacturer's recommendations.

Processed gypsum that has become partially air set, lumpy, or caked shall not be used. The plaster/cellulose fiber mulch shall be applied at a rate of 6.75 tonnes of plaster mixed with 2.242 tonnes of fiber per hectare.

The plaster/cellulose fiber mulch stabilizer shall formulate a protective crust-like barrier within 4 to 8 hours after application. Application of the plaster/cellulose fiber mulch stabilizer shall not be permitted when weather conditions are unsuitable for concrete placement in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02380

STONE PROTECTION

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SECTION 02380

STONE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 88	**(1990) Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate**
ASTM C 127	**(1988; R 1993el) Specific Gravity and Absorption of Coarse Aggregate**
ASTM C 131	**(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine**
ASTM C 136	**(1996a) Sieve Analysis of Fine and Coarse Aggregates**
ASTM C 295	**(1998) Petrographic Examination of Aggregates for Concrete**
ASTM D 75	**(1987; R 1997) Sampling Aggregates**
ASTM D 1141	**(1998) Substitute Ocean Water**
ASTM D 3740	**(2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction**
ASTM D 4791	**(1995) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate**
ASTM D 4992	**(1994el) Evaluation of Rock to be Used for Erosion Control**
ASTM D 5313	**(1992; R 1997) Evaluation of Durability of Rock for Erosion Control Under Wetting and Drying Conditions**
ASTM D 5519	**(1994) Particle Size Analysis of Natural**

and Man-Made Riprap Materials

ASTM E 548 **(1994) General Criteria Used for Evaluating Laboratory Competence**

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 148 **(1969) Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol**

COE CRD-C 169 **(1993) Resistance of Rock to Wetting and Drying**

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Source of Stone; G, RE.

The submittal shall include the name and location of the Contractor's proposed quarry source in accordance with paragraph: **TESTING AND SOURCES**.

Testing Laboratory; G, RE.

The submittal shall include the name of the Contractor's gradation sampling and testing laboratory in accordance with paragraph: **TESTS AND INSPECTIONS**.

SD-04 Samples

Stone Quality.

Samples of stone for testing, in accordance with paragraph: **MATERIALS**, shall be submitted 45 days in advance of the time when the stone will be used.

Bulk Specific Gravity.

At least 30 calendar days in advance of shipment of stone to the work site, submit a copy of bulk specific gravity test results for each gradation range of stone proposed to be furnished. The information shall be furnished prior to preparation of pre-production demonstration stockpiles.

SD-05 Design Data

Method of Placement.

The submittal shall include a detailed description of the proposed method

of placement of riprap including the equipment to be used and logistic considerations.

SD-06 Test Reports

Gradation Testing.

Results of required gradation tests, in accordance with paragraph: Gradation Sampling and Testing, shall be submitted prior to placement of riprap.

Daily Report of Operations.

Contractor to submit daily report of operation at the end of each day.

SD-07 Certificates

Waybills and Delivery Tickets.

Copies of waybills or delivery tickets shall be submitted in accordance with paragraph: Waybills and Delivery Tickets.

Weigh Scale Certification.

Submit a copy of the certification from the regulation agency attesting to the scale's accuracy.

1.3 TESTING AND SOURCES

1.3.1 Stone

1.3.1.1 General

The Contractor shall make all arrangements, pay all royalties, and secure all permits for the procurement, furnishing and transporting of stone. The Contractor shall vary the quarrying, processing, loading and placing operations to produce the sizes and quality of stone specified. If the stone being furnished by the Contractor does not fully meet all of the requirements of these specifications, the Contractor shall furnish at no additional cost to the Government, other stone meeting the requirements of these specifications.

All stone shall be durable material as approved by the Contracting Officer. Selected salvage stone from the required excavation may be used if it satisfies all requirements as to quality and dimensions. In case an unlisted source is to be used, the Contractor shall show that an adequate quantity of material is available. Stone shall be of a suitable quality to ensure permanence after being placed. The stone shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its deterioration from natural causes. An inspection for cracks, fractures, seams and defects shall be made by visual examination. If, by visual examination, it is determined that 10 percent or more of the stone produced contains hairline cracks, then all stone produced by the means and measures which caused the fractures shall be rejected. A hairline crack

that is defined as being detrimental shall have a minimum width of 0.1 mm and shall be continuous for one-third the dimension of at least two sides of the stone. The stone shall be clean and adequately free from all foreign matter. Any foreign material adhering to or combined with the stone as a result of stockpiling shall be removed prior to placement.

1.3.1.2 Sources

Stone shall be furnished from any of the sources listed in paragraph 1.2.1.2.a, or at the option of the Contractor may be furnished from any other source proposed by the Contractor and accepted by the Contracting Officer, subject to the conditions herein stated. If the Contractor proposes to furnish stone from a source not currently listed in paragraph 1.2.1.2.a., the Government will conduct a quarry investigation examine the stockpiles and the quarry faces and take samples to determine whether acceptable stone can be produced from the proposed source. Satisfactory service records on other work may be acceptable. In order for the stone to be acceptable on the basis of service records, stone of a similar size must have been placed in a similar thickness and exposed to weathering under similar conditions as are anticipated for this contract, and must have satisfactorily withstood such weathering for a minimum of 5 years. If no such records are available, the Government will require the Contractor to conduct tests at the Contractor's expense to assure the acceptability of the stone. In addition to an acceptable 5-year service record, the Contracting Officer has the option to elect to have other representative samples taken and tested at the Contractors expense.

a. List of Sources. On the basis of information and data available to the Contracting Officer, stone meeting the quality requirements of these specifications has been produced from the sources listed below:

Quarry	Location
El Dorado	Henderson, NV
Sloan	SW of City of Las Vegas

b. Selection of Source. The Contractor shall designate in writing only one source or a combination of sources from which the Contractor proposes to furnish stone. The Contractor's has the responsibility to determine that the stone source or combination of sources selected is capable of providing the quality, quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work. Samples for acceptance testing shall be provided in accordance with paragraph EVALUATION TESTING below. If a source for stone so designated by the Contractor is not accepted for use by the Contracting Officer, the Contractor may propose other sources at no additional cost to the Government.

c. Source Authorization. Before any stone is produced from a source for completion of the work under this contract, the source or sources of stone must be authorized by the Contracting Officer's Representative. Authorization of a stone source shall

not be construed as a waiver of the right of the Government to require the Contractor to furnish stone which complies with these specifications.

d. Acceptance of Materials. Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for stone as determined by the Contracting Officer. The Contracting Officer also reserves the right to reject individual units of produced specified materials in stockpiles at the quarry, all transfer points, and at the project construction site when such materials are determined to be unsuitable. During the course of the work, the stone may be tested by the Government, if the Contracting Officer determines that testing is necessary. If such tests are determined necessary, the testing will be done in a commercial laboratory selected by the Contractor and approved by the Government. Any and all materials produced from a listed or unlisted source shall meet all the requirements herein. The cost of testing will be at the Contractor's expense. During the contract period, both prior to and after materials are delivered to the job site, visual inspections and measurements of the stone materials may be performed by the Contracting Officer. If the Contracting Officer, during the inspections, finds that the stone quality, gradation or weights of stone being furnished are not as specified or are questionable, re-sampling and re-testing by the Contractor shall be required. Sampling of the delivered stone for testing and the manner in which the testing is to be performed shall be as directed by the Contracting Officer. This additional sampling and testing shall be performed at the Contractor's expense when test results indicate that the materials do not meet specified requirements. When test results indicate that materials meet specified requirements, an equitable adjustment in the contract price will be made for the sampling and testing. Any material rejected shall be removed or disposed of as specified and at the Contractor's expense.

1.3.1.3 Construction Tolerances

The finished surface and stone layer thickness shall not deviate from the lines and grades shown by more than the tolerances listed below. Tolerances are measured perpendicular to the indicated neatlines. Extreme limits of the tolerances given shall not be continuous in any direction for more than five (5) times the nominal stone dimension nor for an area greater than 9.3 m2 of the structure surface.

NEATLINE TOLERANCES

MATERIAL	ABOVE NEATLINE mm	BELOW NEATLINE mm
Grouted stone	50	50

The intention is that the work shall be built generally to the required

elevations, slope and grade and that the outer surfaces shall be even and present a neat appearance. Placed material not meeting these limits shall be removed or reworked as directed by the Contracting Officer. Payment will not be made for excess material which the Contracting Officer permits to remain in place.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Stone

2.1.1.1 Evaluation Testing of Stone

If the Contractor proposes to furnish stone from an unlisted source, or a listed source which has not been tested in 5 years, the Contractor shall have evaluation tests performed on stone samples collected from the proposed source (see paragraph h below). The quarry investigation shall be performed by the Contracting Officer's Representative, a representative of the Contractor, a representative of the Quarry and an engineering geologist from the Geotechnical Branch of the Los Angeles District. The tests to which the stone shall be subjected include petrographic examination (ASTM C 295), bulk specific gravity (SSD), unit weight, absorption (ASTM C 127), wetting and drying (COE CRD-C 169 & ASTM D 5313), Abrasion/L.A. Rattler (ASTM C 131) and sulfate soundness (ASTM C 88). All expenses of the testing shall be paid for by the Contractor.

The laboratory to perform the required testing shall be approved based on compliance with ASTM E 548 and relevant paragraphs of ASTM D 3740, and no work requiring testing shall be permitted until the laboratory has been inspected and approved.

a. Bulk Specific Gravity. All stone shall have a minimum bulk specific gravity, saturated surface dry (SSD), of 2.65 based upon water having a unit weight of 1000 kN/m3. The method of test for bulk specific gravity (SSD) shall be ASTM C 127.

b. Unit Weight and Absorption. All stone shall have an absorption less than 2 percent unless other tests and service records show that the stone is satisfactory. The method of test for unit weight and absorption shall be ASTM C 127, except the unit weight shall be calculated in accordance with Note No. 3 using bulk specific gravity, saturated surface dry.

c. Petrographic Examination. Stone shall be evaluated in accordance with ASTM C 295 which shall include information required by ASTM D 4992, paragraph 10. COE CRD-C 148 shall be used to perform Ethylene Glycol tests required on rocks containing smectite and on samples identified to contain swelling clays. See note 5 below.

d. Wetting and Drying. All stone shall pass the required 15 cycles of wetting and drying in order to be placed on the job. This test does need to be done if the quarry has been used in the last five years and has a suitable service record. The test must be run on any and all new sources of stone. See COE CRD-C 169 and ASTM D 5313. The laboratory shall furnish

color photographs of the slab samples prior to and after the wetting and drying tests have been completed. (See Notes 1 and 2 below).

e. Sulfate Soundness: In accordance with ASTM C 88; 10% maximum loss. (see Notes 3 and 4 below).

f. Abrasion - L. A. Rattler. In accordance with ASTM C 131; 50% maximum lass at 1,000 revolutions. See Note 4.

g. In addition to the above tests, the stone shall be subjected to X-Ray diffraction analysis in accordance with ASTM C 295. The stone must not contain any expansive clays.

h. Samples. Samples of stone from a proposed source shall be taken at the quarry by the Contracting Officer's Representative, the Superintendent of the quarry, the Contractor and an engineering geologist from the Geotechnical Branch of the Los Angeles District. The samples shall consist of at least 135 kg of stone. The quarry faces and the stockpiles to be used shall be examined and sampled. The Contractor will then ship the samples at the Contractors expense to a licensed testing Laboratory which has been approved by the Contracting Officer's Representative. The laboratory will be under the direct supervision of a state licensed Civil Engineer, Geotechnical Engineer, Geologist or Engineering Geologist. The results of the tests shall be delivered to the Contracting Officer's Representative as soon as they are received from the laboratory. The samples shall be submitted a minimum of 30 days in advance of the time when the stone will be required in the work.

i. Tests. The tests shall be conducted by the Contractor in accordance with applicable ASTM and Corps of Engineers methods of tests given in the Handbook for Concrete and Cement, and shall be performed at a laboratory approved by the Contracting Officer's Representative. All cost of testing shall be paid for by the Contractor.

NOTE: (1) Test Procedures for the Wetting and Drying Test: The entire sample should be large enough to produce two cut slabs, 25 millimeters thick (+- 5 millimeters) with a minimum surface area of 20,000 square millimeters on one side. Two chunks approximately 75 by 100 millimeters are also chosen. The slabs and chunks are carefully examined under a low power microscope and all visible surface features are noted and recorded. The specimens are then over dried at 60 degrees Celsius for eight hours, cooled and weighed to the nearest tenth of a gram. The test specimens are photographed to show all surface features before the test. The test specimens are then subjected to fifteen cycles of wetting and drying. One slab and one chunk are soaked in fresh tap water, the other slab and chunk are soaked in salt water prepared in accordance with ASTM D 1141. Each cycle consists of soaking for sixteen hours at room temperature and then drying in an oven for eight hours at 60 degrees Celsius. After each cycle the specimens are examined with the low power microscope to check for opening of movement of fractures, flaking along edges, swelling of clays, softening of rock surfaces, heaving of micaceous minerals, breakdown of matrix material and any other evidence of weakness developing in the rock. The cycle in which any of these actions occur is recorded. After fifteen cycles, the slabs and chunks are again carefully examined and all charges

in the rocks are noted and recorded. The test specimens together with all particles broken off during the test are oven dried, weighed and photographed.

NOTE: (2): Weakening and loss of individual surface particles is permissible unless bonding of the surface grains softens and causes general disintegration of the surface material.

NOTE: (3): The test shall be made on 50 particles each weighing 100 grams, +- 5 grams, in lieu of the gradation given in ASTM C 88.

NOTE: (4): Stone which has a loss greater than the specified limit will be accepted if the Contractor demonstrates that the stone has a satisfactory service record. A satisfactory service record is defined as five years of satisfactory service on a structure similar to this structure.

NOTE: (5): The test procedure for the Petrographic and X-Ray Diffraction is performed according to ASTM C 295, except for the following:

(a). A colored microscopic photograph shall be made of each stone type (whether igneous, sedimentary or metamorphic) and the individual minerals within the stone type shall be identified by labels and arrows upon the photograph.

(b). A very detailed macroscopic and microscopic description shall be made of the stone, to include the entire mineral constituents, individual sizes, their approximate percentages and mineralogical histories. A description of the stone hardness, texture, weathering and durability factors shall also be discussed.

(c). A written summary of the suitability of the stone for use as stone protection based upon the Petrographic and X-Ray tests and the abrasion loss (L. A. Rattler) shall be presented in the final laboratory report on stone quality.

2.1.1.2 Stone Acceptance

a. Prior to placement all stone shall be subject to acceptance by the Contracting Officer's Representative. Acceptance of any stone shall not constitute acceptance of all stone from a source. All accepted stone shall be of the same lithology as the original stone from which test results or service records were taken as a basis for authorization of the source.

b. The stone shall be: (a) sound, durable, hard, and free from laminations, weak cleavages, undesirable weathering, or blasting or handling-induced fractures. (b) of such character that it will not disintegrate from the action of air, water or conditions of handling and placing: (c) clean and free from earth, clay, refuse, or adherent coatings.

c. Salvaged stone from the excavation may be used only if the stone meets the same quality and dimension requirements as stone from a new or formerly used quarry or source of stone. Salvaged material may be tested at the Contractor's expense at the discretion of the Contracting Officer's Representative in order to insure that the meets all requirements.

2.1.1.3 Quarry Operations

Quarry operations shall be conducted by the Contractor in a manner that shall produce stone conforming to the requirements specified and may involve selective quarrying, handling, processing, blending, and loading as necessary, all of which shall be as specified in Section 01451 CONTRACTOR QUALITY CONTROL.

2.1.1.4 Gradation Testing

The Contractor shall perform a gradation test or tests on the stone at the quarry in accordance with paragraph GRADATION TEST METHOD FOR GRADED STONE. The sample shall be taken by the Contractor in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer not less than 3 days in advance of each test. In the event of unavailability of the Contracting Office, the Contractor shall perform the tests and certify to the Contracting Officer that the stone shipped complies with the specifications. At least one gradation test shall be performed of each size of stone placed. The gradation tests shall be reported using the forms, GRADATION TEST DATA SHEET and ENG FORM 4794-RM, attached at end of this section. The Contractor shall designate on the test form that portion in tons (metric) of the lot tested which is applicable to this contract. Any deviation from the reported tonnage shall be corrected and recorded on a revised GRADATION TEST DATA SHEET. The sample shall consist of not less than two tons (metric) of stone, and shall be collected in a random manner which will provide a sample which accurately reflects the actual gradation arriving at the jobsite. The sample shall consist of between 30 to 35 pieces of stone. A minimum of two tests are required for acceptance of stone. The weight of the individual pieces of stone, representing the minimum, maximum and 50 percent greater than sizes for the specified stone gradation, shall be printed on each stone and be placed in a location adjacent to the work site in order to provide a basis for visual comparison during placement of the stone. These stones shall be used as the last order of work. Failure of the test on the initial sample and on an additional sample will be considered cause for rejection of the quarry and/or quarry process, and all riprap, or any stone represented by the failed tests shall be set aside and not incorporated into the work. Any additional tests required because of the failure of an initial test sample will not be considered as one of the other required tests. If collected by the truckload, each truckload shall be representative of the gradation requirements. The Contracting Officer may direct additional testing of the stone at the project site if the stone appears, by visual inspection, to be out of gradation. The additional tests shall be performed on in-place materials at the locations directed, or on random loads selected by the Contracting Officer. In-place test areas shall be not less than 3.6 m by 3.6 m and shall include the full thickness of the placed stone layer, without disturbing or including the underlying material and shall meet the minimum sample size specified above. Each pit excavated for an in-place test sample shall be refilled and reworked to provide a surface void of signs of disturbance. One in-place gradation shall be performed on each 7500 tons (metric) or portion thereof placed. If the gradation test fails, additional gradation tests will be required at the Contractor's expense to delineate the limits of

unacceptable stone. The additional gradation tests shall not count as part of the minimum number of gradation tests required. The unacceptable stone shall either be reworked to bring the stone within the specified gradation or the stone shall be removed from the project site as determined by the Contracting Officer. The Contracting Officer may direct this testing under the Contract Clause INSPECTION OF CONSTRUCTION. The Contractor shall provide all necessary screens, scales and other equipment, and operating personnel, and shall grade the sample. Certification and test results shall represent stone shipped from the quarry. All certification and tests results must be received by the Contracting Officer at the jobsite before any stone is used in the work.

2.1.1.5 Proportional Dimension Limitations

The maximum aspect ratio (greatest dimension:least dimension) of any piece of stone for size ranges, shall be not greater than 3:1 when measured across mutually perpendicular axis. Not more than 25 percent (25%) of the stones within a gradation range shall have an aspect ratio greater than 2.5:1. A maximum of 5 percent flat and elongated pieces by weight will be acceptable. A flat and elongated piece of stone is defined as having a ratio of width to thickness or length to width greater than 3:1. ASTM D 4791 shall be used as a guide to perform the test.

2.1.1.6 Stone for Riprap and Grouted Riprap

Stone may be obtained from a source authorized by the Contracting Officer's Representative and shall be reasonably well-graded between the limits specified below, when tested in accordance with ASTM D 5519, Test Method A.

STONE GRADATION FOR 300 mm THICK RIPRAP

Approximate Average Stone Size in Millimeters	Percent Smaller By Weight Of Total Mixture
300-220	100
200-180	50
160-120	15

STONE GRADATION FOR 600 mm THICK RIPRAP

Approximate Average Stone Size in Millimeters	Percent Smaller By Weight Of Total Mixture
600-450	100
400-350	50
320-240	15

PART 3 EXECUTION

3.1 CONSTRUCTION PLAN

The Contractor shall submit a **Method of Placement (Construction Plan)**

indicating the methods and equipment proposed to conduct all construction related operations. The plan shall be submitted to the Contracting Officer for approval not less than 10 days prior to the start of construction operations. The plan shall include as a minimum, but is not limited to, the following information:

Order of work and all proposed time lines.
Operation/use of the work/storage area.
Site access route(s) and preparation requirements.

3.1.1 Weigh Scale Certification

Prior to shipping stone and after all stone has been shipped, the Contractor shall submit a copy of the certification from the regulation agency attesting to the scale's accuracy.

3.2 DAILY REPORT OF OPERATIONS

The Contractor will be required to prepare and maintain a Daily Report of Operations and furnish copies thereof to the Contracting Officer's Representative. The daily reports shall document all construction related operations for all shifts in a 24-hour period. Further instruction on the preparation of the report will be provided. Copies of sample submittals are provided at the end of the Contractor's Quality Control section.

3.3 PLACEMENT OF STONE PROTECTION

3.3.1 Debris

Any timbers, unsatisfactory material and debris within the reaches for construction shall be removed except as otherwise directed by the Contracting Officer, and upon removal shall become the property of the Contractor. All materials shall be properly disposed of in accordance with the requirements of Section 01355 ENVIRONMENTAL PROTECTION, including any applicable local requirements.

3.3.2 Stone

Stone shall be placed to the lines, grades and thickness shown. Stone placement shall start at the bottom of the stone structure and extend upward to the top of the structure in a neat, orderly fashion. Placement shall be with reasonably systematic care that segregation of particle sizes will not occur. If the materials are placed by clam shell, dragline, or other similar equipment, the stone shall not be dropped from a height exceeding 460 mm above the previously placed material. The finished surface of the stone shall be adequately smooth and shall be free of mounds or windrows. The finished work shall be free of clusters or small stones and cluster of larger stones.

3.3.3 Underlayer Stone

Stone shall be placed to a full zone thickness in one operation in a manner to avoid displacing the underlying material or placing undue impact force on underlying materials and supporting subsoils. The underlayer stone

shall be placed in a manner to produce a resultant graded mass of stone with minimum voids. Rearranging of individual stones may be required to achieve this result. Placement by any method which is likely to cause segregation of the various sizes shall not be permitted. Unsegregated stone shall be lowered in a bucket or container and placed in a systematic manner directly on the underlying material. Placement shall begin at the bottom of the slope and proceed upward. Casting or dropping of stone, or moving by drifting and manipulating down the slope will not be permitted. Final finish of the slope shall be performed as the material is placed.

3.3.4 Demonstration Section

3.3.4.1 General

Prior to placement of any stone, the Contractor shall construct a section of a levee to demonstrate proposed operations. The section shall demonstrate procedures, methods, equipment, and capability for placing new stone within the tolerances specified. The demonstration section shall consist of an area designated by the Contracting Officer. The quantities and gradation of all materials placed within the section shall be accurately tabulated and provided immediately to the Contracting Officer. The demonstration section shall conform with all applicable requirements specified herein.

3.3.4.2 Demonstration Section Evaluation

The Contractor shall not proceed with stone placement prior to the approval of the demonstration section by the Contracting Officer. Within a period of 3 days after completion of the section, the Contracting Officer shall determine the adequacy and acceptability of the section. The Contractor shall be notified as to the acceptability of the section. If the Contracting Officer determines the demonstration is non-compliant, the Contractor will be required to modify the methods of construction, equipment, and materials until compliance with these specifications is achieved. Upon acceptance of the demonstration section by the Contracting Officer, the demonstration section will be considered part of the new work.

3.4 TESTS AND INSPECTIONS

3.4.1 Pre-Production

3.4.1.1 Bulk Specific Gravity

Quantity determinations are contingent upon the range of bulk specific gravity (saturated surface dry (SSD) basis) of stone to be supplied. Therefore, during the process of selecting a source or sources of stone for the project, the Contractor shall make an investigation to determine the lowest and highest bulk specific gravity (SSD) of stone available at the source or sources he proposes to utilize for each gradation range of stone. Tests shall be performed at a Government approved testing laboratory. The testing results shall be submitted in accordance with paragraph SUBMITTALS. Test results which display an extraordinarily wide range of values may necessitate additional testing to determine whether the source contains strata with stones of an acceptable range of bulk specific gravity. For

sources which have been acceptably tested not more than five years earlier, and the material is of an acceptable quality and bulk specific gravity, the Contracting Officer may waive the requirement for bulk specific gravity testing.

3.4.1.2 Demonstration Stockpile at Source

Following submittal of the Contractor's Quality Control (CQC) Plan and the Contractor's selection of a source, but prior to the Government's approval of a source and the CQC Plan, the Contractor shall make arrangements to provide a pre-production demonstration stockpile for each of the stone size ranges for the project. The stockpiles shall be located at the source of the stone and be shaped in windrow fashion. All stones placed in the demonstration stockpiles shall be representative of the overall quality of materials in the source and shall not consist of the best specimens unless it is reasonable to determine that the source will provide the required amount of stone of the applicable size range with a degree of quality no less than that existent in the demonstration stockpile. The quantity of stone in each demonstration stockpile shall be dependent upon the gradation size range to be produced for the project.

3.4.1.3 Evaluation of Demonstration Stockpile at Source

The Contractor shall notify the Contracting Officer when stockpiles are ready for evaluation. The Contractor's approved Quality Control Plan (QCP) supervisor and all QCP inspectors shall accompany the Contracting Officer's Representative (COR) during the Government's evaluation of the demonstration stockpiles. The Contractor shall arrange to have individual stones turned as necessary to accommodate the COR's evaluation. The COR will mark rejected stones with a red "X" and such stones shall be removed to the reject stockpile or to a crusher if one is available. If more than 5% unacceptable stones are found within a stockpile, the entire stockpile will be rejected by the Government and a replacement stockpile will be created for re-evaluation. If the replacement stockpile is rejected, the Contractor shall revise and resubmit its Quality Control Plan (QCP) and shall create another replacement demonstration stockpile for evaluation. If the third demonstration stockpile for a particular size range at a single source is found unacceptable, the source will be disapproved for such size rang and a new source shall be submitted for approval. The Contractor may, of its own accord, choose a replacement source at the time a first or second demonstration stockpile is found unacceptable. The replacement of demonstration stockpiles or stone sources shall be at no additional cost to the Government and with no change in the time of completion.

3.4.1.4 Borderline Material Quality

If the COR's evaluation of a demonstration stockpile results in not being able to determine by visual examination whether the material is acceptable or unacceptable, the COR will select at least one but not more than three representative stones from the demonstration stockpile to be prepared for shipment a commercial laboratory for testing in accordance with paragraph EVALUATION TESTING OF STONE. Where specified sizes are in excess of 900 kg. the Contractor shall cut or break off a representative piece, weighing

approximately 900 kg each, from each of the selected stones. For specified stone sizes of less than 900 kg but more than 230 kg, individual samples shall be the size of the largest stone specified for the size range. Samples of stone groupings with a maximum size less than 230 kg shall contain at least two (2) stones representative of the higher limit of the stone weights specified. In addition, the sample shall be representative of the gradation specified and the minimum weight of the total sample shall be not less than 230 kg. The sampling and testing procedures shall be repeated for each strata being quarried. The Contractor shall ship the samples to the laboratory as specified in paragraph EVALUATION TESTING OF STONE. If the laboratory testing reveals the materials are unacceptable, the Contractor shall submit a replacement source for approval and proceed with the demonstration stockpile procedures new.

3.4.1.5 Approval of Demonstration Stockpile at Source

At the time the COR finds the contents of a demonstration stockpile to be acceptable, either through visual examination or through laboratory testing, the Contractor will be notified in writing that the source, the QCP plan and QCP staff are approved, whereupon the Contractor may proceed with production of materials for the project provided they are consistent with demonstration stockpiles.

3.4.1.6 Placement Control

The Contractor shall establish and maintain quality control for all work performed at the job site under this section to assure compliance with contract requirements. He shall maintain records of his quality control tests, inspections and corrective actions. Quality control measures shall cover all construction operations including, but not limited to, the placement of all materials to the slope and grade lines shown and in accordance with this section.

3.5 BEDDING LAYERS, FILTER LAYERS, AND SAND FILL

3.5.1 General

The Contractor shall perform gradation tests to assure compliance with contract requirements and shall maintain detailed records. The bedding material, filter materials and/or sand fill shall be sampled in accordance with ASTM D 75 and tested in accordance with ASTM C 136. The Contractor shall perform the tests before and after surveys of each layer of stone protection material placed.

3.5.2 Reporting

Reporting shall be in accordance with paragraph GRADATION TEST.

3.6 DELIVERY

3.6.1 Waybills and Delivery Tickets for Truck Transport

Copies of waybills or delivery tickets shall be submitted to the Contracting Officer. The Contractor shall furnish the scale tickets for

each load of material weighed; these tickets shall include tare weight, identification mark of each vehicle weighed, date, time, and location of the loading. A master log of all vehicle loading(s) shall be furnished for each day of loading operation. The Contractor shall file with the Contracting Officer the master log of loadings, certified waybills and/or certified tickets as part of the Daily Report of Operations. Prior to the final payment, the Contractor shall furnish written certification that the material recorded on the submitted waybills and/or certified tickets was actually used in the construction covered by the contract.

3.6.2 Scale Tickets and Records for Barge Transportation

Copies of Scale Tickets and/or Records of weights, including displacement weight date, shall be submitted to the Contracting Officer's Representative for each load of material delivered to the site. The Contracting Officer's Representative will determine from the displacement weight date, the weight of stone shipped by barge and will certify displacement weight records. Each scale ticket and/or record shall include the gross, rate, dunnage, and net weight of stone. The weight of dunnage for each load will be determined, recorded, and certified by the Contracting Officer's Representative. Deliveries and numbered scale tickets and/or records shall be recorded on an approved system to maintain delivery control. Copies of scale tickets and/or records shall be delivered to the Contracting Officer's Representative as part of the Daily Report of Operations. Prior to the final payment, the Contractor shall submit the certified scale tickets and/or certified records for stone used in the construction to the Contracting Officer.

3.6.3 Rejected Stone

Any and all stone which does not meet the specifications herein shall be considered rejected and shall be removed off of the job at the Contractors expense.

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AGGREGATE BASE COURSE

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SECTION 02722

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	(1988; R 1993el) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	(1997) Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and

Plasticity Index of Soils

ASTM E 11 (1995) Wire-Cloth Sieves for Testing Purposes

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT), MATERIALS TESTING DIVISION

NDOT T230C (Rev C) Method of Test For Determining the Percent of Fractured Faces

1.2 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.2.1 Aggregate Base

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.2.2 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools.

List of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets; G, RE.

Copies of waybills and delivery tickets during the progress of the work. Before the final statement is allowed, the Contractor shall file certified waybills and certified delivery tickets for all aggregates actually used.

SD-06 Test Reports

Sampling and testing; G, RE.

Field Density Tests; G, RE.

Calibration curves and related test results prior to using the

device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Certified copies of test results for approval not less than 30 days before material is required for the work.

1.4 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01451 CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Contracting Officer may specify the time and location of the tests. Copies of test results shall be furnished to the Contracting Officer within 24 hours of completion of the tests.

1.4.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.4.2 Tests

The following tests shall be performed in conformance with the applicable standards listed.

1.4.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM C 117 and ASTM C 136. Sieves shall conform to ASTM E 11. Particle-size analysis of the soils shall also be completed in conformance with ASTM D 422.

1.4.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Moisture-Density Determinations

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 1557.

1.4.2.4 Field Density Tests

Density shall be field measured in accordance with ASTM D 1556. For the method presented in ASTM D 1556 the base plate as shown in the drawing shall be used.

1.4.2.5 Wear Test

Wear tests shall be made on ABC course material in conformance with ASTM C 131.

1.4.2.6 Fractured Faces

The percentage fractured faces will be determined in accordance with NDOT T230C.

1.4.3 Testing Frequency

1.4.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

a. Sieve Analysis including 0.02 mm size material.

b. Liquid limit and plasticity index.

c. Moisture-density relationship.

d. Wear.

1.4.3.2 In Place Tests

Each of the following tests shall be performed on samples taken from the placed and compacted ABC. Samples shall be taken and tested at the rates indicated.

a. Density tests shall be performed on every lift of material placed and at a frequency of one set of tests for every 250 square meters, or portion thereof, of completed area.

b. Sieve Analysis including 0.02 mm size material shall be performed for every 500 metric tons, or portion thereof, of material placed.

c. Liquid limit and plasticity index tests shall be performed at the same frequency as the sieve analysis.

1.5 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 2 degrees C. When the temperature falls below 2 degrees C, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.6 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required

compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 2 PRODUCTS

2.1 AGGREGATES

The ABC shall consist of clean, sound, durable particles of crushed stone, crushed gravel, angular sand, or other approved material. ABC shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the 4.75 mm sieve shall be known as coarse aggregate; that portion passing the 4.75 mm sieve shall be known as fine aggregate.

2.1.1 Coarse Aggregate

Coarse aggregates shall be angular particles of uniform density. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements and shall be stockpiled separately.

a. Crushed Gravel: Crushed gravel shall be manufactured by crushing gravels, and shall meet all the requirements specified below.

b. Crushed Stone: Crushed stone shall consist of freshly mined quarry rock, and shall meet all the requirements specified below.

2.1.1.1 Aggregate Base Course

ABC coarse aggregate shall not show more than **45 percent loss after 500 revolutions** when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregates shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve listed in TABLE 1.

2.1.2 Fine Aggregate

Fine aggregates shall be angular particles of uniform density. When the fine aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements.

2.1.2.1 Aggregate Base Course

ABC fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed

or naturally combined with the coarse aggregate.

2.1.3 Gradation Requirements

The specified gradation requirements shall apply to the completed base course. The aggregates shall have a maximum size of 25 mm and shall be continuously well graded within the limits specified in TABLE 1. Sieves shall conform to ASTM E 11.

TABLE 1. GRADATION OF AGGREGATES

Sieve Designation	Percentage by Weight Passing Square-Mesh Sieve
25.0 mm	100
19.0 mm	90-100
4.75 mm	35-65
1.18 mm	15-40
0.075 mm	2-10

NOTE 1: Particles having diameters less than 0.02 mm shall not be in excess of 3 percent by weight of the total sample tested.

NOTE 2: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C 127 and ASTM C 128 to determine their specific gravities. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Contracting Officer.

2.1.4 Liquid Limit and Plasticity Index

Liquid limit and plasticity index requirements shall apply to the completed course and shall also apply to any component that is blended to meet the required gradation. The portion of any component or of the completed course passing the 0.425 mm sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC is constructed in more than one layer, the previously constructed layer shall be cleaned of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in areas where power cleaning is not practicable. Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the working area. Line and grade stakes shall be provided as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

Aggregates shall be obtained from offsite sources.

3.3 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer to prevent segregation. Materials obtained from different sources shall be stockpiled separately. Waybills and Delivery tickets are required for each load.

3.4 PREPARATION OF UNDERLYING COURSE

Prior to constructing the ABC, the underlying course or subgrade shall be cleaned of all foreign substances. At the time of construction of the ABC, the underlying course shall contain no frozen material. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. The underlying course shall conform to Section 02300 EARTHWORK. Ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels, as defined in ASTM D 2487, the surface shall be stabilized prior to placement of the ABC. Stabilization shall be accomplished by mixing ABC into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the ABC is placed.

3.5 INSTALLATION

3.5.1 Mixing the Materials

The coarse and fine aggregates shall be mixed in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. The Contractor shall make adjustments in mixing procedures or in equipment as directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory ABC meeting all requirements of this specification.

3.5.2 Placing

The mixed material shall be placed on the prepared subgrade in a single layer of uniform thickness with an approved spreader. No layer shall exceed 200 mm or less than 75mm when compacted. The layer shall be so placed that when compacted it will be true to the grades or levels required

with the least possible surface disturbance.

3.5.3 Grade Control

The finished and completed ABC shall conform to the lines, grades, and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required ABC thickness so that the finished ABC with the subsequent surface course will meet the designated grades.

3.5.4 Edges of Base Course

Additionally, approved fill material shall be placed along the outer edges of ABC in sufficient quantities to compact to the thickness of the course being constructed allowing at least a 300 mm width of this material to be rolled and compacted. If this base course material is to be placed adjacent to another pavement section, then the layers for both of these sections shall be placed and compacted along this edge at the same time.

3.5.5 Compaction

Each layer of the ABC shall be compacted to 100% or as specified on the drawings with approved compaction equipment. Water content shall be maintained during the compaction procedure to within **plus or minus 2 percent** of the optimum water content determined from laboratory tests as specified in paragraph SAMPLING AND TESTING. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. **Compaction shall continue until each layer has degree of compaction that is at least 100 percent of laboratory maximum density through the full depth of the layer.** The Contractor shall make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory ABC. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

3.5.6 Thickness

Compacted thickness of the aggregate course shall be as indicated. No individual layer shall exceed 200 mm nor be less than 75 mm in compacted thickness. The total compacted thickness of the ABC course shall be within 13 mm of the thickness indicated. Where the measured thickness is more than 13 mm deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 13 mm thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 6 mm of the thickness indicated. The total thickness of the ABC course shall be measured at

intervals in such a manner as to ensure one measurement for each 500 square meters of base course. Measurements shall be made in 75 mm diameter test holes penetrating the base course.

3.5.7 Finishing

The surface of the top layer of ABC shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course to meet grade. If the elevation of the top layer of ABC is 13 mm or more below grade, then the top layer should be scarified to a depth of at least 75 mm and new material shall be blended in and compacted to bring to grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked and recompacted or it shall be replaced as directed.

3.5.8 Smoothness

The surface of the top layer shall show no deviations in excess of 10 mm when tested with a 3.05 meter straightedge. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.6 TRAFFIC

Completed portions of the ABC course may be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Heavy equipment shall not be permitted except when necessary to construction, and then the area shall be protected against marring or damage to the completed work.

3.7 MAINTENANCE

The ABC shall be maintained in a satisfactory condition until the full pavement section is completed and accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any area of ABC that is damaged shall be reworked or replaced as necessary to comply with this specification.

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

Any unsuitable materials that must be removed shall be disposed of as directed. No additional payments will be made for materials that must be replaced.

-- End of Section --

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HOT-MIX ASPHALT (HMA) FOR ROADS

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SECTION 02741

HOT-MIX ASPHALT (HMA) FOR ROADS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO MP1	**(1998) Provisional Specification for Performance Graded Asphalt Binder**

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 150	(1999a) Portland Cement
ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM D 140	(2000) Sampling Bituminous Materials
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 995	(1995b) Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
ASTM D 1461	(1985; R 1994) Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D 1559	(1989) Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

ASTM D 2489	(2000) Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D 2950	(1997) Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 3381	(1992; R 1999) Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 3666	(2000) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4867/D 4867M	(1996) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 5444	(1998) Mechanical Size Analysis of Extracted Aggregate

ASPHALT INSTITUTE (AI)

AI MS-2	(1997) Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT), MATERIALS TESTING DIVISION

NDOT T230C	(Rev C) Method of Test For Determining the Percent of Fractured Faces

1.2 DESCRIPTION OF WORK

The work shall consist of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. HMA designed and constructed in accordance with this section shall conform to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Quality Control Plan for hot-mix asphalt; G, RE.

The Contractor shall develop an approved Quality Control Plan for hot-mix asphalt. Hot-mix asphalt for payment shall not be produced until the quality control plan has been approved.

SD-03 Product Data

Waybills and Delivery Tickets.

Waybills and delivery tickets submitted during progress of the work.

SD-04 Samples

Asphalt Cement Binder.

Samples of the asphalt cement binder specified shall be submitted for approval not less than 14 days before start of the test section.

SD-05 Design Data

Bituminous Pavement Mix Design; G, RE.

Copy of Mix Design selected. Report to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Job Mix Formula; G, RE.

Properties of Bituminous Pavement Mixture; G, RE.

The job mix formula and properties of bituminous pavement mixture shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of paving operations.

SD-06 Test Reports

Asphalt Content.

Aggregate Gradation.

Aggregate Moisture.

Temperatures.

Moisture Content of Mixture.

Laboratory Air Voids, Marshall Stability and Flow.

In-place Density.

Thickness.

Grade Conformance and Surface Smoothness.

Copies of test results. Reports to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Asphalt Cement Binder.

Copies of test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer.

Aggregates; G, RE.

All aggregate test results and samples shall be submitted to the Contracting Officer at least 14 days prior to start of construction.

QC Monitoring; G, RE.

QC test results.

SD-07 Certificates

Testing Laboratory; G, RE.

Certification of compliance.

Plant Scale Calibration Certification.

Certificate of the testing laboratory, certification of compliance, and plant scale calibration certification.

1.4 ASPHALT MIXING PLANT

Plants used for the preparation of hot-mix asphalt shall conform to the requirements of ASTM D 995 with the following changes:

a. Truck Scales. The asphalt mixture shall be weighed on approved certified scales at the Contractor's expense. Scales shall be inspected and sealed at least annually by an approved calibration laboratory. The plant scale shall have a valid plant scale calibration certification.

b. Testing Facilities. The Contractor shall provide all necessary laboratory facilities for the Contractor's quality control testing and use of the Government for acceptance testing, as necessary.

c. Inspection of Plant. The Contracting Officer shall have access at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. The Contractor shall provide assistance as requested, for the Government to procure any desired samples.

d. Storage Bins. Use of storage bins for temporary storage of hot-mix asphalt will be permitted as follows:

(1) The asphalt mixture may be stored in non-insulated storage bins for a period of time not exceeding 3 hours.

(2) The asphalt mixture may be stored in insulated storage bins for a period of time not exceeding 8 hours. The mix drawn from bins shall meet the same requirements as mix loaded directly into trucks.

1.5 HAULING EQUIPMENT

Trucks used for hauling hot-mix asphalt shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Petroleum based products shall not be used as a release agent. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers (tarps) shall be securely fastened.

1.6 ASPHALT PAVERS

Asphalt pavers shall be self-propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing courses of hot-mix asphalt which will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

1.7 ROLLERS

Rollers shall be in good condition and shall be operated at slow speeds to avoid displacement of the asphalt mixture. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. Equipment which causes excessive crushing of the aggregate shall not be used.

1.8 STRAIGHTEDGE

The Contractor shall furnish and maintain at the site, in good condition, one 3.66 m straightedge for each bituminous paver. Straightedge shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

1.9 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

Finished surface of bituminous courses shall conform to gradeline and elevations shown and to surface smoothness requirements specified.

1.9.1 Plan Grade

The grade of the completed surface shall not deviate more than 15.2 mm from the plan grade.

1.9.2 Surface Smoothness

When a 3.66 m straightedge is laid on the surface parallel with the centerline of the paved area or transverse from crown to pavement edge, the surface shall vary not more than 6.4 mm from the straightedge.

1.10 GRADE CONTROL

Lines and grades shall be established and maintained by means of line and grade stakes placed at site of work. Elevations of bench marks used by the Contractor for controlling pavement operations at the site of work will be determined, established, and maintained by the Government. Finished pavement elevations shall be established and controlled at the site of work by the Contractor in accordance with bench mark elevations furnished by the Contracting Officer.

1.11 WEATHER LIMITATIONS

The hot-mix asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Contracting Officer, if requested; however, all other requirements, including compaction, shall be met.

Table 1. Surface Temperature Limitations of Underlying Course

Mat Thickness, mm	Degrees C
75 or greater	4
Less than 75	7

PART 2 PRODUCTS

2.1 AGGREGATES

Aggregates shall consist of stone, crushed stone, gravel, crushed gravel, screenings, natural sand and mineral filler, as required. The portion of material retained on the 4.75 mm sieve is coarse aggregate. The portion of material passing the 4.75 mm sieve and retained on the 0.075 mm sieve is fine aggregate. The portion passing the 0.075 mm sieve is defined as mineral filler. All aggregate test results and samples shall be submitted to the Contracting Officer at least 14 days prior to start of construction.

2.1.1 Coarse Aggregate

Coarse aggregate shall consist of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. All individual coarse aggregate sources shall meet the following requirements:

a. The percentage of loss shall not be greater than 45 percent after 500 revolutions when tested in accordance with ASTM C 131.

b. The portion of the material larger than the 10 mm screen shall contain at least 75 percent particles having fractured faces when tested in accordance with NDOT T230C.

2.1.2 Fine Aggregate

Fine aggregate shall consist of clean, sound, tough, durable particles. The aggregate particles shall be free from coatings of clay, silt, or any objectionable material and shall contain no clay balls. Fine aggregate shall have a plasticity index of 6 percent or less and a liquid limit of 35 percent or less when tested in accordance with ASTM D 4318.

2.1.3 Mineral Filler

Mineral filler shall consist of Portland cement conforming to ASTM C 150 or shall be mechanically reduced rock with the following gradation.

Grain size in mm	Percent Finer
0.075	75-100
0.05	65-100
0.02	35-65
0.01	26-35
0.005	10-22

Grain size shall be determined in accordance with ASTM D 422.

2.1.4 Aggregate Gradation

The combined aggregate gradation shall conform to the gradation specified in Table 2, when tested in accordance with ASTM C 136 and ASTM C 117, and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine.

Table 2. Aggregate Gradation

Sieve Size, mm	BIKE PATH PAVING Percent Passing by Mass	STREET PAVING Percent Passing by Mass
25	100	100
19	100	90-100
12.5	100	78-94
9.5	90-100	68-84

Table 2. Aggregate Gradation

Sieve Size, mm	BIKE PATH PAVING Percent Passing by Mass	STREET PAVING Percent Passing by Mass
4.75	55-85	50-65
2.36	32-67	30-49
0.30	7-27	7-25
0.075	2-10	2-9

2.2 ASPHALT CEMENT BINDER

Asphalt cement binder for use in bike path paving shall conform to PG 70-16 in accordance with AASHTO MP1. Asphalt cement binder **for use in street paving** shall conform to ASTM D 3381 Table 2, Viscosity Grade AC-40. Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer. The supplier is defined as the last source of any modification to the binder. The Contracting Officer may sample and test the binder at the mix plant at any time before or during mix production. Samples for this verification testing shall be obtained by the Contractor in accordance with ASTM D 140 and in the presence of the Contracting Officer. These samples shall be furnished to the Contracting Officer for the verification testing, which shall be at no cost to the Contractor.

2.3 MIX DESIGN

The Contractor shall develop the bituminous pavement mix design. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF). No hot-mix asphalt for payment shall be produced until a JMF has been approved. The hot-mix asphalt shall be designed using procedures contained in AI MS-2 and the criteria shown in Table 3. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867/D 4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost. Sufficient materials to produce 90 kg of blended mixture shall be provided to the Contracting Officer for verification of mix design at least 14 days prior to the start of construction.

2.3.1 JMF Requirements

The job mix formula and properties of bituminous pavement mixture shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of paving operations and shall include as a minimum:

a. Percent passing each sieve size.

b. Percent of asphalt cement.

c. Percent of each aggregate and mineral filler to be used.

d. Asphalt viscosity grade.

e. Number of blows of hammer per side of molded specimen.

f. Laboratory mixing temperature.

g. Lab compaction temperature.

h. Temperature-viscosity relationship of the asphalt cement.

i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.

j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2.

k. Specific gravity and absorption of each aggregate.

l. Percent natural sand.

m. Percent particles with 2 or more fractured faces (in coarse aggregate).

n. Fine aggregate angularity.

o. Tensile Strength Ratio (TSR).

p. Antistrip agent (if required) and amount.

q. List of all modifiers and amount used.

Table 3. Marshall Design Criteria

Test Property	50 Blow Mix
Stability, newtons minimum	*4450
Flow, 0.25 mm	8-18
Air voids, percent	3-5
TSR, minimum percent	75

* This is a minimum requirement. The average during construction shall be

significantly higher than this number to ensure compliance with the specifications.

2.3.2 Adjustments to Field JMF

The Laboratory JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new laboratory design shall be performed and a new JMF approved before the new material is used. The Contractor will be allowed to adjust the Laboratory JMF within the limits specified below to optimize mix volumetric properties with the approval of the Contracting Officer. Adjustments to the Laboratory JMF shall be applied to the field (plant) established JMF and limited to those values as shown. Adjustments shall be targeted to produce or nearly produce 4 percent voids total mix.

Table 4. Field (Plant) Established JMF Tolerances

Sieves	Adjustments (plus or minus), percent
12.5 mm	3
4.75 mm	3
2.36 mm	3
0.075 mm	1
Binder Content	0.4

If adjustments are needed that exceed these limits, a new mix design shall be developed. Tolerances given above may permit the aggregate grading to be outside the limits shown in Table 2; while not desirable, this is acceptable.

PART 3 EXECUTION

3.1 PREPARATION OF ASPHALT BINDER MATERIAL

The asphalt cement material shall be heated avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of unmodified asphalts shall be no more than 160 degrees C when added to the aggregates. Modified asphalts shall be no more than 174 degrees C when added to the aggregates.

3.2 PREPARATION OF MINERAL AGGREGATE

The aggregate for the mixture shall be heated and dried prior to mixing. No damage shall occur to the aggregates due to the maximum temperature and rate of heating used. The temperature of the aggregate and mineral filler shall not exceed 175 degrees C when the asphalt cement is added. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.3 PREPARATION OF HOT-MIX ASPHALT MIXTURE

The aggregates and the asphalt cement shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but no less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D 2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to at least achieve 95 percent of coated particles. The moisture content of all hot-mix asphalt upon discharge from the plant shall not exceed 0.5 percent by total weight of mixture as measured by ASTM D 1461.

3.4 PREPARATION OF THE UNDERLYING SURFACE

The underlying surface shall be maintained in suitable condition for the placement of asphaltic pavement. Immediately before placing the hot mix asphalt, the underlying course shall be cleaned of dust and debris. The surface of the base course will be inspected for adequate compaction and surface tolerances specified in paragraph: GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS. Unsatisfactory areas shall be corrected, prior to commencement of asphaltic pavement lay down operations.

3.5 TESTING LABORATORY

The laboratory used to develop the JMF shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction. The certification shall contain as a minimum:

a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.

b. A listing of equipment to be used in developing the job mix.

c. A copy of the laboratory's quality control system.

d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

3.6 TRANSPORTING AND PLACING

3.6.1 Transporting

The hot-mix asphalt shall be transported from the mixing plant to the site in clean, tight vehicles. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided for night placements. Hauling over freshly placed material will not be permitted until the material has been compacted as specified, and allowed to cool to 60 degrees C. To deliver mix to the paver, the Contractor shall use a material transfer vehicle which shall be operated to produce continuous

forward motion of the paver. Waybills and delivery tickets are to be submitted with each load.

3.6.2 Placing

The mix shall be placed and compacted at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, the mixture shall be placed to the full width by an asphalt paver; it shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The mixture shall be placed in consecutive adjacent strips having a minimum width of 3 m. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 300 mm; however, the joint in the surface course shall be at the centerline of the pavement. Transverse joints in one course shall be offset by at least 3 m from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 3 m. On isolated areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand tools.

3.7 COMPACTION OF MIXTURE

After placing, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible without causing displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. After the Contractor is assured of meeting grade and smoothness requirements, rolling shall be continued until all roller marks are eliminated and at least 95 percent of the laboratory maximum density has been achieved. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened but excessive water will not be permitted. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hand tampers. Any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective shall be removed full depth, replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching will not be allowed.

3.8 JOINTS

The formation of joints shall be made ensuring a continuous bond between the courses and to obtain the required density. All joints shall have the

same texture as other sections of the course and meet the requirements for smoothness and grade.

3.8.1 Transverse Joints

The roller shall not pass over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing material at the joint. The cutback material shall be removed from the project. In both methods, all contact surfaces shall be given a light tack coat of asphalt material before placing any fresh mixture against the joint.

3.8.2 Longitudinal Joints

Longitudinal joints which are irregular, damaged, uncompacted, cold (less than 80 degrees C at the time of placing adjacent lanes), or otherwise defective, shall be cut back a minimum of 50 mm from the edge with a cutting wheel to expose a clean, sound vertical surface for the full depth of the course. All cutback material shall be removed from the project. All contact surfaces shall be given a light tack coat of asphalt material prior to placing any fresh mixture against the joint. The Contractor will be allowed to use an alternate method if it can be demonstrated that density, smoothness, and texture can be met.

3.9 CONTRACTOR QUALITY CONTROL

3.9.1 General Quality Control Requirements

The Contractor shall develop an approved Quality Control Plan for hot-mix asphalt. Hot-mix asphalt for payment shall not be produced until the quality control plan has been approved. The plan shall address all elements which affect the quality of the pavement including, but not limited to:

a. Mix Design

b. Aggregate Grading

c. Quality of Materials

d. Stockpile Management

e. Proportioning

f. Mixing and Transportation

g. Mixture Volumetrics

h. Moisture Content of Mixtures

i. Placing and Finishing

j. Joints

k. Compaction

l. Surface Smoothness

3.9.2 Testing Laboratory

The Contractor shall have access to a fully equipped asphalt laboratory. The laboratory shall meet the requirements as required in ASTM D 3666. Laboratory facilities shall be kept clean and all equipment shall be maintained in proper working condition. The Contracting Officer shall be permitted unrestricted access to inspect the Contractor's laboratory facility, to witness quality control activities, and to perform any check testing desired. The Contracting Officer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When, in the opinion of the Contracting Officer, the deficiencies are serious enough to adversely affect test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are corrected.

3.9.3 Quality Control Testing

The Contractor shall perform all quality control tests applicable to these specifications and as set forth in the Quality Control Program. The testing program shall include, but shall not be limited to, tests for the control of asphalt content, aggregate gradation, aggregate moisture, temperatures, moisture content of mixture, laboratory air voids, Marshall stability and flow, in-place density, thickness, grade conformance and surface smoothness. A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

3.9.3.1 Asphalt Content

A minimum of one test to determine asphalt content will be performed per 500 metric tons of asphaltic concrete produced.

3.9.3.2 Aggregate Gradation

Aggregate gradations shall be determined for each **250 metric tons** of asphaltic concrete produced from mechanical analysis of recovered aggregate in accordance with ASTM D 5444. For batch plants, aggregates shall be tested in accordance with ASTM C 136 using actual batch weights to determine the combined aggregate gradation of the mixture.

3.9.3.3 Aggregate Moisture

The moisture content of aggregate used for production shall be determined a minimum of once per shift in accordance with ASTM C 566.

3.9.3.4 Temperatures

At least one measurement of asphaltic concrete temperature shall be taken in each hour, in which paving operations are being conducted. Additional tests at additional locations, to determine the temperature at the dryer, the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site, may be required as directed by the Contracting Officer.

3.9.3.5 Moisture Content of Mixture

The moisture content of the mixture shall be determined at least once per shift in accordance with ASTM D 1461 or an approved alternate procedure.

3.9.3.6 Laboratory Air Voids, Marshall Stability and Flow

Mixture samples shall be taken at least once per 1000 metric tons and compacted into specimens, using 50 blows per side with the Marshall hammer as described in ASTM D 1559. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

3.9.3.7 In-Place Density

At least three cores will be recovered and tested for every 1000 square meters of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer. The Contractor may conduct any additional necessary testing to ensure the specified density is achieved. A nuclear gauge may be used to monitor pavement density in accordance with ASTM D 2950. Record sampling will be by use of cores as indicated above.

3.9.3.8 Thickness

At least three cores will be recovered and tested for every 1000 square meters of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer.

3.9.3.9 Grade Conformance and Surface Smoothness

The Contractor shall conduct the necessary checks to ensure the grade and smoothness requirements are met in accordance with paragraph GRADE AND SURFACE SMOOTHNESS REQUIREMENTS.

3.9.3.10 Additional Testing

Any additional testing, which the Contractor deems necessary to control the process, may be performed at the Contractor's option.

3.9.3.11 QC Monitoring

The Contractor shall submit all QC test results to the Contracting Officer on a daily basis as the tests are performed. The Contracting Officer reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's quality control testing. At the completion of asphalt work the Contractor

shall submit a certification of compliance indicating that the work is in compliance with this section.

3.9.4 Action Required

3.9.4.1 Asphalt Content

If there is a failure to meet the specified asphalt content production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified asphalt is being supplied.

3.9.4.2 Aggregate Gradation

When the amount passing any sieve is outside the specification limits, the aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

3.9.4.3 Aggregate Moisture Content

When the moisture content of the aggregates is outside specification requirements the aggregates shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

3.9.4.4 Temperature

When the temperature of the bituminous mixture is outside specification requirements the mixture shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation. In no case will overheated or carbonized mixtures be allowed.

3.9.4.5 Asphalt Properties

If there is a failure in any of the asphalt properties production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified properties are being achieved.

3.9.4.6 Density

When test results indicate lack of compaction additional specimens will be obtained as directed by the Contracting Officer. Based on the test results the Contractor will remove and replace the affected areas of pavement.

3.9.4.7 Thickness

When test results indicate that the finished pavement is 6 mm less than the thickness shown on the drawings, additional samples will be taken to determine the extent of defective thickness. The area determined will be

removed and replaced or may be overlaid. The overlay will be a minimum of 25 mm thick and will be placed to duplicate slopes and drainages of the original pavement. No skin patching will be allowed.

3.9.5 Sampling

When directed by the Contracting Officer, the Contractor shall sample and test any material which appears inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

3.9.6 Reports

All results of tests conducted shall be reported as required. During periods requiring protection from weather, reports of pertinent temperatures or other relevant values shall be made daily. These requirements do not relieve the contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all Contractor Quality Control records.

-- End of Section --

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SECTION 03301

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 117/117R	(1990; Errata) Standard Tolerances for Concrete Construction and Materials
ACI 211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 214	(1977; R 1997) Recommended Practice for Evaluation of Strength Test Results of Concrete
ACI 305R	(1999) Hot Weather Concreting
ACI 318M	(1995) Metric Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31/C 31M	(2000) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1999ae1) Concrete Aggregates
ASTM C 39/C 39M	(1999) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 40	(1999) Organic Impurities in Fine Aggregates for Concrete
ASTM C 42/C 42M	(1999) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 87	(1983; R 1995el) Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
ASTM C 94/C 94M	(2000) Ready-Mixed Concrete

ASTM C 127	(1988; R 1993el) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	(1997) Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	**(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine**
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 142	**(1978; R 1997) Clay Lumps and Friable Particles in Aggregates**
ASTM C 143/C 143M	(2000) Slump of Hydraulic Cement Concrete
ASTM C 150	(1999a) Portland Cement
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 192/C 192M	(2000) Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	(1997e1) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2000) Air-Entraining Admixtures for Concrete
ASTM C 295	**(1998) Petrographic Examination of Aggregates for Concrete**
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494/C 494M	(1999a) Chemical Admixtures for Concrete
ASTM C 535	**(1996el) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine**
ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 597	(1983; R 1997) Pulse Velocity Through Concrete
ASTM C 618	(2000) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete

ASTM C 803/C 803M	(1997el) Penetration Resistance of Hardened Concrete
ASTM C 805	(1997) Rebound Number of Hardened Concrete
ASTM C 881	(1999) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 1059	(1999) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064/C 1064M	(1999) Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1077	(1998) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1107	(1999) Packaged Dry, Hydraulic-Cement Grout(Nonshrink)
ASTM C 1260	**(1994) Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)**
ASTM D 75	(1987; R 1997) Sampling Aggregates

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 94	(1995) Surface Retarders
COE CRD-C 100	(1975) Method of Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate
COE CRD-C 130	**(1989) Scratch Hardness of Coarse Aggregate Particles**
COE CRD-C 143	(1962) Specifications for Meters for Automatic Indication of Moisture in Fine Aggregate
COE CRD-C 318	(1979) Cloth, Burlap, Jute (or Kenaf)
COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 521	(1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44	(1997) NIST Handbook 44: Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100	(1996) Concrete Plant Standards

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete Mixture Proportioning.

Concrete mixture proportions shall be determined by the Contractor and submitted for review. The concrete mixture quantities of all ingredients per cubic meter and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan when used, and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

Batch Plant.

Capacity.

The Contractor shall submit batch plant data to the Contracting Officer for review for conformance with applicable specifications.

Concrete Mixers.

Conveying Equipment.

Placing Equipment.

All concrete mixers, conveying equipment, and placing equipment and methods shall be submitted for review by the Contracting Officer for conformance with paragraph CAPACITY.

Tests and Inspections.

Testing Technicians.

Concrete Transportation Construction Inspector (CTCI).

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the specified requirements. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Transportation Construction Inspector (CTCI).

Construction Joint Treatment; G, RE.

The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review and approval.

Curing and Protection; G, RE.

The curing medium and methods to be used shall be submitted for review and approval.

Cold-Weather Placing; G, RE.

If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection shall be submitted for approval.

Hot-Weather Placing; G, RE.

If concrete is to be placed under hot-weather conditions, the proposed materials and methods shall be submitted for review and approval.

Finishing; G, RE.

The proposed materials and methods to be used for finishing concrete shall be submitted for review and approval.

SD-04 Samples

Aggregates; G, RE.

Cementitious Materials, Admixtures, and Curing Compound; G, RE.

Samples of materials for government testing and approval shall be submitted as required in paragraph PRECONSTRUCTION SAMPLING AND TESTING.

SD-06 Test Reports

Quality of Aggregates; G, RE.

Aggregate quality tests shall be submitted at least 30 days prior to start of concrete placement.

Mixer Uniformity.

The results of the initial mixer uniformity tests shall be submitted at least 5 days prior to the initiation of placing.

Test Results and Inspection Reports.

Test results and inspection reports shall be submitted daily and weekly as required in paragraph REPORTS.

SD-07 Certificates

Cementitious Materials.

Cementitious Materials, including Cement and Pozzolan, will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished. Certification and mill test reports shall be from samples taken from the particular lot furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious materials will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. Material not meeting specifications shall be promptly removed from the site of work.

Chemical Admixtures.

Chemical Admixtures (air-entraining, accelerating, water reducing or retarding admixtures) shall be certified for compliance with all specification requirements.

Membrane-Forming Curing Compound.

Membrane-Forming Curing Compound shall be certified for compliance with all specification requirements.

Epoxy Resin.

Latex Bonding Compound.

Epoxy Resin and Latex Bonding Compound shall be certified for compliance with all specification requirements.

Nonshrink Grout.

Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

1.3 GOVERNMENT TESTING AND SAMPLING

The Government will sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172.

1.3.1 Preconstruction Sampling and Testing

1.3.1.1 Aggregates

The aggregate sources listed in Section 2.1.2 for aggregates have been tested and at the time testing was performed were capable of producing materials of a quality required for this project provided suitable processing is performed. The Contractor may furnish materials from a listed source or from a source not listed. Samples from any source of coarse aggregate and any source of fine aggregate selected by the Contractor, consisting of not less than 70 kg of each size coarse aggregate and 35 kg of fine aggregate taken under the supervision of the Contracting Officer in accordance with COE CRD-C 100 shall be delivered to a local materials testing laboratory within 15 days after notice to proceed. Sampling and shipment of samples shall be at the Contractor's expense. Sixty days will be required to complete evaluation of the aggregates. Testing will be performed by and at the expense of the Government in accordance with the applicable COE CRD-C or ASTM test methods. The cost of testing one source for each size of aggregate will be borne by the Government. If the Contractor selects more than one source for each aggregate size or selects a substitute source for any size aggregate after the original source was tested, the cost of that additional testing will be borne by the Contractor. Tests to which aggregate may be subjected are listed in paragraph **QUALITY OF AGGREGATES**. The material from the proposed source shall meet the quality requirements of this paragraph. The Government's test data and other information on aggregate quality of those sources listed **herein after** are included in the Design Memorandum and are available for review in the district office. Testing of aggregates by the Government does not relieve the Contractor of the requirements outlined in paragraph TESTS AND INSPECTIONS.

1.3.1.2 Cementitious Materials, Admixtures, and Curing Compound

At least 60 days in advance of concrete placement, the Contractor shall notify the Contracting Officer of the sources for cementitious materials, admixtures, and curing compound, along with sampling location, brand name, type, and quantity to be used in the manufacture and/or curing of the concrete.

1.3.2 Construction Testing by the Government

Sampling and testing will be performed by and at the expense of the Government except as otherwise specified. No material shall be used until notice has been given by the Contracting Officer that test results are satisfactory.

1.3.2.1 Chemical Admixtures Storage

Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the Contractor when directed by the Contracting Officer and shall be rejected if test results are not satisfactory. Chemical admixtures will be accepted based on compliance with the requirements of paragraph CHEMICAL ADMIXTURES.

1.3.2.2 Cement and Pozzolan

If cement or pozzolan is to be obtained from more than one source, the initial notification shall state the estimated amount to be obtained from each source and the proposed schedule of shipments.

a. **Cement Sources - Cement shall be delivered and used directly from a mill of a producer designated as an acceptable source. Samples of cement for check testing will be taken at the project site or concrete-producing plant by a representative of the Contracting Officer for testing at the expense of the Government.**

b. **Pozzolan Sources - Pozzolan shall be delivered and used directly from a producer designated as an acceptable source. Samples of pozzolan for check testing will be taken at the project site by a representative of the Contracting Officer for testing at the expense of the Government.**

1.3.2.3 Concrete Strength

Compressive strength test specimens will be made by the Government and cured in accordance with ASTM C 31/C 31M and tested in accordance with ASTM C 39/C 39M. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 3.5 MPa. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

a. Investigation of Low-Strength Test Results - When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 3.5 MPa or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803/C 803M, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

b. Testing of Cores - When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in

accordance with ASTM C 42/C 42M. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

c. Load Tests - If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318M. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contacting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

1.4 DESIGN REQUIREMENTS

1.4.1 Concrete Strength

Specified compressive strength f'c shall be 30 MPa at 28 days for all concrete structures.

1.4.2 Maximum Water-Cement (W/C) Ratio

Maximum W/C shall be 0.45 for all concrete structures.

1.5 CONSTRUCTION TOLERANCES

1.5.1 General

The definitions of the terms used in the following tables shall be as defined in ACI 117/117R. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal. Tolerances are not cumulative. The most restrictive tolerance controls. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment, and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A tolerance without sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction.

TOLERANCE FOR FINISHED FORMED CONCRETE SURFACES

(1) Vertical alignment

Formed surfaces slope with

TOLERANCE FOR FINISHED FORMED CONCRETE SURFACES

respect to the specified plane

All conditions ..... 10 mm in 3000 mm

(2) Abrupt variation
The offset between concrete surfaces for the following classes of surface:

Class A ..... 3 mm
Class B ..... 6 mm
Class C ..... 6 mm
Class D ..... 25 mm

(3) Gradual variation

Surface finish tolerances as measured by placing a freestanding (unleveled), 1.5 m straightedge for plane surface or curved template for curved surface anywhere on the surface and allowing it to rest upon two high spots within 72 hr after concrete placement. The gap at any point between the straightedge or template and the surface shall not exceed:

Class A ..... 3 mm
Class B ..... 6 mm
Class C ..... 13 mm
Class D ..... 25 mm

TOLERANCES FOR CHANNEL LINING

(1) Lateral alignment

Alignment of tangents ..... 50 mm
Alignment of curves ..... 100 mm
Width of section at any height ..... 0.0025W + 25 mm

(2) Level alignment

Profile grade ..... 25 mm
Surface of invert ..... 6 mm
Height of lining ..... 0.005H + 25 mm

(3) Cross-sectional dimensions

Thickness of lining cross section: 10 percent specified thickness provided average thickness is maintained as determined by daily

TOLERANCES FOR CHANNEL LINING

batch volumes.

TOLERANCES FOR CONDUITS AND CULVERTS

(1) Lateral alignment

Centerline alignment

Water conveying conduits, and culverts ..... 13 mm

Inside dimensions ..... 0.005 times inside dimension

(2) Level alignment

Profile grade

Water conveying conduits, and culverts ..... 13 mm

Surface of invert ..... 6 mm

Surface of side slope ..... 13 mm

(3) Cross-sectional dimension

Thickness at any point

Conduits and Culverts..... +5 percent thickness but not less than 13 mm
..... -2.5 percent thickness but not less than 6 mm

1.5.2 Appearance

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is approved by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall be portland cement, or portland-pozzolan cement, and shall conform to appropriate specifications listed below.

2.1.1.1 Portland Cement

ASTM C 150, Type V low alkali.

2.1.1.2 High-Early-Strength Portland Cement

ASTM C 150, Type III, with C_3A limited to 8 percent low alkali, used only when specifically approved in writing.

2.1.1.3 **Pozzolan**

Pozzolan shall conform to ASTM C 618, Class F, with the **loss of ignition limited to 6 percent**.

2.1.2 Aggregates

2.1.2.1 General

Concrete aggregates may be furnished from any source capable of meeting the quality requirements of ASTM C 33. No guarantee is given or implied that any of the listed sources are currently capable of producing aggregates that meet the requirements of ASTM C 33. Fine and coarse aggregates shall conform to the grading requirements of ASTM C 33. The nominal maximum size shall be as listed in paragraph NOMINAL MAXIMUM-SIZE COARSE AGGREGATE. Where the use of highway department gradations are permitted, proposed gradations shall be submitted for approval.

2.1.2.2 Concrete Aggregate Sources

a. List of Sources - The concrete aggregates sources may be selected from the following list:

Nevada Ready Mix	Lone Mountain Pit
CSR Materials	Buffalo Road Pit
Hanson Aggregates	Henderson

b. Selection of Source - After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed at the end of this section, he may designate only a single source or single combination of sources for aggregates. Regardless of the source, selected samples for acceptance testing shall be provided as required by paragraph GOVERNMENT TESTING AND SAMPLING. If a source for coarse or fine aggregates so designated by the Contractor does not meet the quality requirements stated in paragraph **QUALITY OF AGGREGATES**, the Contractor may not submit for approval other non-listed sources but shall furnish the coarse or fine aggregate, as the case may be, from sources listed above at no additional cost to the Government.

2.1.3 Chemical Admixtures

Chemical admixtures to be used, when required or permitted, shall conform to the appropriate specification listed.

2.1.3.1 Air-Entraining Admixture

The air-entraining admixture shall conform to ASTM C 260 and shall consistently cause the concrete to have an air content in the specified ranges under field conditions.

2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494/C 494M, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

2.1.3.3 Water-Reducing or Retarding Admixture

a. Water-Reducing or Retarding Admixtures: ASTM C 494/C 494M, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

b. High-Range Water Reducing Admixture: ASTM C 494/C 494M, Type F or G except that the 6-month and 1-year strength requirements shall be waived. The admixture may be used only when approved by the Contracting Officer, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan.

2.1.4 Curing Materials

2.1.4.1 Membrane-Forming Curing Compound

The membrane-forming curing compound shall conform to ASTM C 309, Type 2, except a styrene acrylate or chlorinated rubber compound meeting Class B requirements shall be used for surfaces that are to be painted or are to receive bituminous roofing, or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, coating, or flooring specified. Nonpigmented compound shall contain a fugitive dye and shall have the reflective requirements in ASTM C 309 waived.

2.1.4.2 Burlap

Burlap used for curing shall conform to COE CRD-C 318.

2.1.5 Water

Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that nonpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.6 Nonshrink Grout

Nonshrink grout shall conform to ASTM C 1107 and shall be a commercial formulation suitable for the application proposed.

2.1.7 Latex Bonding Compound

Latex bonding compound agents for bonding fresh to hardened concrete shall conform to ASTM C 1059.

2.1.8 Epoxy Resin

Epoxy resin for use in repairs shall conform to ASTM C 881, Type III, Grade I or II.

2.2 CONCRETE MIXTURE PROPORTIONING

2.2.1 Quality of Mixture

For each portion of the structure, mixture proportions shall be selected so that the strength and W/C requirements listed in paragraph DESIGN REQUIREMENTS are met.

2.2.2 Nominal Maximum-Size Coarse Aggregate

Nominal maximum-size coarse aggregate shall be 37.5 mm except 19.0 mm nominal maximum-size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 190 mm, the depth of the slab is less than 100 mm, or the minimum clear spacing between reinforcing is less than 55 mm.

2.2.3 Air Content

Air content as delivered to the forms and as determined by ASTM C 231 shall be between 4 and 7 percent except that when the nominal maximum-size coarse aggregate is 19.0 mm, it shall be between 4-1/2 and 7-1/2 percent.

2.2.4 Slump

The slump shall be determined in accordance with ASTM C 143/C 143M and shall be within the range of 25 mm to 100 mm. Where placement by pump is approved, the slump shall not exceed 150 mm.

2.2.5 Concrete Proportioning

Trial batches and testing requirements for various qualities of concrete specified shall be the responsibility of the Contractor. Samples of aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios, which will produce a range of strength encompassing those required for the work. The maximum water-cement ratios required in paragraph MAXIMUM WATER-CEMENT RATIO will be converted to a weight ratio of water to cement plus pozzolan by mass, as described in ACI 211.1. If pozzolan is used in the concrete mixture, the minimum pozzolan content shall be 15 percent of the total cementitious material. Trial mixtures shall be proportioned for maximum permitted slump and air content with due consideration to the approved conveying and placement method. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio, at least three test

cylinders for each test age shall be made and cured in accordance with ASTM C 192/C 192M. They shall be tested at 7 days and at the design age specified in paragraph DESIGN REQUIREMENTS in accordance with ASTM C 39/C 39M. From these test results, a curve will be plotted showing the relationship between water-cement ratio and strength.

2.2.6 Required Average Compressive Strength

In meeting the strength requirements specified in paragraph CONCRETE STRENGTH, the selected mixture proportion shall produce a required average compressive strength f'cr exceeding the specified strength f'c by the amount indicated below.

2.2.6.1 Average Compressive Strength from Test Records

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected, shall represent concrete produced to meet a specified strength or strengths (f'c) within 6.89 MPa of that specified for proposed work, and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another test age designated for determination of f'c.

Required average compressive strength f'cr used as the basis for selection of concrete proportions shall be the larger of the equations that follow using the standard deviation as determined above:

$$f'cr = f'c + 1.34S$$
$$f'cr = f'c + 2.33S - 3.45 \text{ MPa}$$

Where S = standard deviation

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and a modification factor from the following table:

NUMBER OF TESTS*	MODIFICATION FACTOR FOR STANDARD DEVIATION Use tabulation in paragraph DETERMINING REQUIRED AVERAGE STRENGTH
less than 15	
15	1.16
20	1.08
25	1.03
30 or more	1.00

*Interpolate for intermediate numbers of tests.

2.2.6.2 Average Compressive Strength without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, the required average strength f'cr shall be determined as follows:

If the specified compressive strength f'c is less than 20.7 MPa,

f'cr = f'c + 6.89 MPa

If the specified compressive strength f'c is 20.7 to 34.5 MPa,

f'cr = f'c + 8.27 MPa

If the specified compressive strength f'c is over 34.5 MPa,

f'cr = f'c + 9.65 MPa

PART 3 EXECUTION

3.1 EQUIPMENT

3.1.1 Capacity

The batching, mixing, conveying, and placing equipment shall have a capacity of at least 100 cubic meters per hour.

3.1.2 Batch Plant

Batch plant shall conform to the requirements of NRMCA CPMB 100 and as specified; however, rating plates attached to batch plant equipment are not required.

3.1.2.1 Batching Equipment

The batching controls shall be, semiautomatic. The semiautomatic batching system shall be provided with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with an accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Separate bins or compartments shall be provided for each size group of aggregate and cement, and pozzolan. Aggregates shall be weighed either in separate weigh batchers with individual scales or cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cement or pozzolan. If both cement and pozzolan are used, they may be batched cumulatively provided that the portland cement is batched first. If measured by mass, the mass of the water shall not be weighed cumulatively with another ingredient. Water batcher filling and discharging valves shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. An accurate mechanical device for measuring and dispensing each admixture shall be provided. Each dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and discharged automatically in a manner to obtain uniform distribution throughout the batch in the specified mixing period. Admixtures shall not be combined prior to introduction in water. The plant shall be arranged so as to

facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment. All filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

3.1.2.2 Scales

The equipment for batching by mass shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Tests shall be made at the frequency required in paragraph TESTS AND INSPECTIONS, and in the presence of a government inspector.

3.1.2.3 Batching Tolerances

a. Weighing Tolerances

MATERIAL	PERCENT OF REQUIRED MASS
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

b. Volumetric Tolerances - For volumetric batching equipment, the following tolerances shall apply to the required volume of material being batched:

Water: ..... Plus or minus 1 percent.
Chemical admixtures: ..... Zero to plus 6 percent.

3.1.2.4 Moisture Control

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched. An electric moisture meter complying with the provisions of COE CRD-C 143 shall be provided for measuring moisture in the fine aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the sand bin or in the sand batcher.

3.1.3 Concrete Mixers

The concrete mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

3.1.3.1 Stationary Mixers

Concrete plant mixers shall be tilting, nontilting, horizontal-shaft, vertical-shaft, or pugmill and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixing time and uniformity shall conform to all the requirements in ASTM C 94/C 94M applicable to central-mixed concrete.

3.1.3.2 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94/C 94M. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it will be possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

3.1.4 Conveying Equipment

The conveying equipment shall conform to the following requirements.

3.1.4.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least five times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 0.2 square meter. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 1.5 cubic meters shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

3.1.4.2 Transfer Hoppers

Concrete may be charged into nonagitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and have conical-shaped discharge features. The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external vibration to effect complete discharge. Concrete shall not be held in nonagitating transfer hoppers more than 30 minutes.

3.1.4.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94/C 94M. Nonagitating equipment may be used for transporting plant-mixed concrete over a smooth road when the hauling time is less than 15 minutes. Bodies of nonagitating equipment shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will

permit positive control of the discharge of the concrete.

3.1.4.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete.

3.1.4.5 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 900 mm. The belt speed shall be a minimum of 90 m per minute and a maximum of 230 m per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant trunk that is long enough to extend through the reinforcing bars.

3.1.4.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three times the nominal maximum-size coarse aggregate in the concrete mixture to be pumped but not less than 100 mm. Aluminum pipe shall not be used.

3.1.5 Vibrators

Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

APPLICATION	HEAD DIAMETER mm	FREQUENCY VPM	AMPLITUDE mm
Thin walls, beams, etc.	32 to 64	9,000 to 13,500	0.5 to 1.0
General construction	50 to 88	8,000 to 12,000	0.6 to 1.2

The frequency and amplitude shall be determined in accordance with COE CRD-C 521.

3.2 PREPARATION FOR PLACING

3.2.1 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on

the drawings, or required. Embedded items shall be free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding, including tack welding, will not be permitted on embedded metals within 600 mm of the surface of the concrete.

3.2.2 Concrete on Earth Foundations

Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with Section 02300 EARTHWORK.

3.2.3 Concrete on Rock Foundations

Rock surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semidetached, or unsound fragments. Joints in rock shall be cleaned to a satisfactory depth, as determined by the Contracting Officer, and to firm rock on the sides. Immediately before the concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of air-water jets or sandblasting as described in paragraph CONSTRUCTION JOINT TREATMENT. All rock surfaces shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. The mortar shall be covered with concrete before the time of initial setting of the mortar.

3.2.4 Construction Joint Treatment

Construction joint treatment shall conform to the following requirements.

3.2.4.1 Joint Preparation

Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by cleaning with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean, well bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. The surface shall be washed clean again as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed.

3.2.4.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 620 to 760 kPa, and the water pressure shall be just

sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in applications. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

3.2.4.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 20.7 MPa may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse-aggregate particles. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

3.2.4.4 Wet Sandblasting

This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

3.2.4.5 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

3.3 PLACING

3.3.1 Placing Procedures

The surfaces of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete. Surfaces may be dampened immediately before placement if necessary. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. Concrete shall be deposited as close as possible to its final position in the forms and, in so depositing, there shall be no vertical drop greater than 1.5 m except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it may be effectively consolidated in horizontal layers 600 mm or less in thickness with a minimum of lateral movement. The amount deposited in each location shall be that which can be readily and thoroughly consolidated. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed. Concrete shall be placed by methods that will prevent segregation or loss of

ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper that is conical in shape. The concrete shall not be dropped vertically more than 1.5 m, except where a properly designed and sized elephant truck with rigid drop chute bottom section is provided to prevent segregation and where specifically authorized. In no case will concrete be discharged to free-fall through reinforcing bars. **All concrete shall be placed from the low elevation end to the higher elevation end (up slope) unless otherwise approved by the Contracting Officer.**

3.3.2 Placement by Pump

When concrete is to be placed by pump, the nominal maximum-size coarse aggregate shall not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms. Grout used to lubricate the pumping equipment at the beginning of the placement will not be incorporated into the placement.

3.3.3 Time Interval Between Mixing and Placing

Concrete shall be placed within 30 minutes after discharge into nonagitating equipment. When concrete is truck-mixed or when a truck mixer or agitator is used for transporting concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. When the length of haul makes it impossible to deliver truck-mixed concrete within these time limits, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site.

3.3.4 Cold-Weather Placing

When cold-weather placing of concrete is likely to be subjected to freezing temperatures before the expiration of the curing period, it shall be placed in accordance with procedures previously submitted in accordance with paragraph SUBMITTALS. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be above 0 degrees C. The placing temperature of the concrete having a minimum dimension less than 300 mm shall be between 12 and 24 degrees C when measured in accordance with ASTM C 1064/C 1064M. The placing temperature of the concrete having a minimum dimension greater than 300 mm shall be between 10 and 20 degrees C. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

3.3.5 Hot-Weather Placing

Concrete shall be properly placed and finished with procedures previously submitted in accordance with paragraph SUBMITTALS. The concrete-placing temperature shall not exceed 30 degrees C when measured in accordance with ASTM C 1064/C 1064M. Cooling of the mixing water and aggregates, or both, may be required to obtain an adequate placing temperature. A retarder meeting the requirements of paragraph WATER-REDUCING OR RETARDING ADMIXTURE may be used to facilitate placing and finishing. Steel forms and reinforcement shall be cooled prior to concrete placement when steel temperatures are greater than 50 degrees C. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature.

3.3.6 Consolidation

Immediately after placement, each layer of concrete, including flowing concrete, shall be consolidated by internal vibrating equipment. Vibrators shall not be used to transport concrete within the forms. Hand spading may be required, if necessary, with internal vibrating along formed surfaces permanently exposed to view. Form or surface vibrators shall not be used unless specifically approved. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 150 mm into the preceding unhardened layer if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly.

3.4 FINISHING

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 5 degrees C. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 1.0 kilogram per square meter per hour. Provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow. All unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish. Additional finishing shall be as specified below and shall be true to the elevation shown in the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

3.4.1 Unformed Surfaces

3.4.1.1 Float Finish

Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing

operation. The concrete, while still green but sufficiently hardened to bear a man's weight without deep imprint, shall be floated to a true and even plane. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be made of magnesium or aluminum.

3.4.1.2 Trowel Finish

A trowel finish shall be applied to the top of channel walls. Concrete surfaces shall be finished with a float finish, and after surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish free from blemishes including trowel marks.

3.4.1.3 Broom Finish

A broom finish shall be applied to the face and surfaces of concrete channel inverts, and sidewalls. The concrete surface shall be screeded and floated finish plane with no coarse aggregate visible. After surface moisture disappears, the surface shall be broomed or brushed screeded and fine hair-broom or fiber bristle brushed in a direction transverse to that of the channel centerline for all invert side slope areas, or as directed.

3.4.2 Formed Surfaces

Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired as described in paragraph FORMED SURFACE REPAIR.

Uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

3.4.3 Formed Surface Repair

After removal of forms, all ridges, lips, and bulges on surfaces permanently exposed shall be removed. All repairs shall be completed within 48 hours after form removal.

3.4.3.1 Class A Finishes

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class A finishes shall have surface defects repaired as follows: defective areas, voids, and honeycombs smaller than 10,000 square millimeters in area and less than 13 mm deep and bug holes exceeding 13 mm in diameter shall be chipped and filled with dry-packed mortar. Holes left by removal of tie rods shall be reamed and filled with dry-packed mortar as specified in paragraph MATERIAL AND PROCEDURE FOR REPAIRS. Defective and unsound concrete areas larger than described shall be defined by 13 mm deep dovetailed saw cuts in a rectangular pattern with lines parallel to the formwork, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex

bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.2 Class D Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class D finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs greater than 30,000 square millimeters in area or more than 50 mm deep shall be defined by 13 mm deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.3 Material and Procedure for Repairs

The cement used in the dry-packed mortar or replacement concrete shall be a blend of the cement used for production of project concrete and white portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be used to determine the proportions required to match colors. Dry-packed mortar shall consist of one part cement to two and one-half parts fine aggregate. The fine aggregate shall be that used for production of project concrete. The mortar shall be remixed over a period of at least 30 minutes without addition of water until it obtains the stiffest consistency that will permit placing. Mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. and struck off to match adjacent concrete. Replacement concrete shall be produced using project materials and shall be proportioned by the Contracting Officer. It shall be thoroughly compacted into the prepared void by internal vibration, tamping, rodding, ramming, etc. and shall be struck off and finished to match adjacent concrete. Forms shall be used to confine the concrete. If an expanding agent is used in the repair concrete, the repair shall be thoroughly confined on all sides including the top surface. Metal tools shall not be used to finish permanently exposed surfaces. The repaired areas shall be cured for 7 days. The temperature of the in situ concrete, adjacent air, and replacement mortar or concrete shall be above 5 degrees C during placement, finishing, and curing. Other methods and materials for repair may be used only when approved in writing by the Contracting Officer. Repairs of the so called "plaster-type" will not be permitted.

3.5 CURING AND PROTECTION

3.5.1 Duration

Concrete shall be cured by an approved method for a period of 7 days.

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, and mechanical

damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours and from flowing water for 14 days. No fire or excessive heat including welding shall be permitted near or in direct contact with concrete or concrete embedments at any time.

3.5.2 Moist Curing

Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required in paragraph APPEARANCE. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of 50 mm of continuously saturated sand, or by covering with saturated nonstaining burlap or cotton mats. Horizontal construction joints may be allowed to dry for 12 hours immediately prior to the placing of the following lift.

3.5.3 Membrane-Forming Curing Compound

Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface containing protruding steel reinforcement.

3.5.3.1 Application

The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. The surfaces shall be thoroughly moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as free water has disappeared and bleeding has stopped. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 500 kPa, at a uniform coverage of not more than 10 square meters per liter for each coat, and the second coat shall be applied perpendicular to the first coat. Concrete surfaces that have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

3.5.4 Evaporation Retardant

Sheet curing shall not be used on vertical or near-vertical surfaces. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper or polyethylene-coated burlap having the burlap thoroughly

water-saturated before placing. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 300 mm and securely weighted down or shall be lapped not less than 100 mm and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

3.5.5 Cold-Weather Curing and Protection

When the daily outdoor low temperature is less than 0 degrees C, the temperature of the concrete shall be maintained above 5 degrees C for the first 7 days after placing. In addition, during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 15 degrees C as determined by observation of ambient and concrete temperatures indicated by suitable temperatures measuring devices furnished by the Government as required and installed adjacent to the concrete surface and 50 mm inside the surface of the concrete. The installation of the thermometers shall be made by the Contractor at such locations as may be directed.

3.6 SETTING OF POSTS, BASE PLATES, AND BEARING PLATES

3.6.1 Setting of Posts and Plates

After being plumbed and properly positioned, posts, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be provided with full bearing with nonshrink grout. The space between the top of concrete or masonry-bearing surface and the bottom of the plate shall be approximately 1/24 of the width of the plate, but not less than 13 mm for plates less than 300 mm wide. Concrete surfaces shall be rough, clean, and free of oil, grease, and laitance, and they shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

3.6.2 Nonshrink Grout Application

Nonshrink grout shall conform to the requirements of paragraph NONSHRINK GROUT. Water content shall be the minimum that will provide a flowable mixture and fill the space to be grouted without segregation, bleeding, or reduction of strength.

3.6.2.1 Mixing and Placing of Nonshrink Grout

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be of size to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry-bearing surface and the plate shall be filled solid with the grout. Forms shall be

of wood or other equally suitable material for retaining the grout and shall be removed after the grout has set. If grade "A" grout as specified in ASTM C 1107 is used, all surfaces shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be under pressure with a grout pump. Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 20 to 30 degrees C until after setting.

3.6.2.2 Treatment of Exposed Surfaces

After the grout has set, those types containing metallic aggregate shall have the exposed surfaces cut back 25 mm and immediately covered with a parge coat of mortar proportioned by mass of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph CURING AND PROTECTION.

3.7 TESTS AND INSPECTIONS

Tests and inspections shall conform to the following requirements. Test Results and Inspection Reports are to be submitted to the Government as required.

3.7.1 General

The Contractor shall perform the inspections and tests described below, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall be on site and shall conform with ASTM C 1077. The individuals who sample and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Transportation Construction Inspector (CTCI). The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077.

3.7.2 Testing and Inspection Requirements

3.7.2.1 Fine Aggregate

a. Grading - At least once during each shift when the concrete plant

is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and COE CRD-C 104 for the fine aggregate or for each size range of fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits.

b. Corrective Action for Fine Aggregate Grading - When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer.

c. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing foreman. When the electric moisture meter is operating satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.

d. Moisture Content Corrective Action - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device) if necessary to maintain the specified slump.

3.7.2.2 Coarse Aggregate

a. Grading - At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control which are coarser than the specification limits for samples taken at locations other than as delivered to the mixer to allow for degradation during handling.

b. Corrective Action for Grading - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of five tests are outside specification

limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

c. Coarse Aggregate Moisture Content - A test for moisture content of each size group of coarse aggregate shall be made at least twice per week. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified above for fine aggregate, until the difference falls below 1.0 percent.

d. Coarse Aggregate Moisture Corrective Action - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted if necessary to maintain the specified slump.

3.7.2.3 Quality of Aggregates

a. Frequency of Quality Tests - Thirty days prior to the start of concrete placement the Contractor shall perform all tests for aggregate quality listed below. In addition, after the start of concrete placement, the Contractor shall perform tests for aggregate quality in accordance with the frequency schedule shown below. Samples tested after the start of concrete placement shall be taken immediately prior to entering the concrete mixer.

FREQUENCY

PROPERTY	FINE AGGREGATE	COARSE AGGREGATE	TEST
Specific Gravity	**Every 3 months**	**Every 3 months**	**ASTM C 127 ASTM C 128**
Absorption	**Every 3 months**	**Every 3 months**	**ASTM C 127 ASTM C 128**
Clay Lumps and Friable Particles	**Every 3 months**	**Every 3 months**	**ASTM C 142**
Impurities	**Every 3 months**	**Not applicable**	**ASTM C 40 ASTM C 87**
LA Abrasion	**Not applicable**	**Every 6 months**	**ASTM C 131 ASTM C 535**
Soft and Friable (Scratch) Hardness)on	**Not applicable**	**Every 6 months**	**COE CRD-C 130**
Alkali Reactivity			

	FREQUENCY		
PROPERTY	**FINE AGGREGATE**	**COARSE AGGREGATE**	**TEST**
of Aggregates	**Every 6 months**	**Every 6 months**	**ASTM C 1260**
Petrographic Examination	**Every 12 months**	**Every 12 months**	**ASTM C 295**

b. Corrective Action for Aggregate Quality - If the result of a quality test fails to meet the requirements for quality immediately prior to start of concrete placement, production procedures or materials shall be changed and additional tests shall be performed until the material meets the quality requirements prior to proceeding with either mixture proportioning studies or starting concrete placement. After concrete placement commences, whenever the result of a test for quality fails the requirements, the test shall be rerun immediately. If the second test fails the quality requirement, the fact shall be reported to the Contracting Officer and immediate steps taken to rectify the situation.

3.7.2.4 Scales

a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every 3 months for conformance with the applicable requirements of paragraph BATCHING EQUIPMENT. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors.

b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph BATCH PLANT for checking the accuracy of dispensed admixtures are operating properly.

c. Scales Corrective Action - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.7.2.5 Batch-Plant Control

The measurement of all constituent materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the

required aggregate and water weights per cubic meter, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic meter for each class of concrete batched during plant operation.

3.7.2.6 Concrete Mixture

a. **Air Content Testing - At least two tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government quality assurance representative. Tests shall be made in accordance with ASTM C 231. For concrete having a nominal maximum aggregate size of 25 or 37 mm, the average of each set of two tests shall be plotted on a control chart on which the average is set at 5.5 percent and the upper and lower control limits at 7 and 4 percent respectively. For concrete having a nominal maximum aggregate size of 19 mm, the average shall be set at 6.0 percent and the upper and lower control limits at 7.0 and 5.0 percent, respectively. The control charts shall be submitted to the Contracting Officer.**

b. Air Content Corrective Action - Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as is practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the control chart range reaches the warning limit, the admixture dispenser shall be recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted. All this shall be at no extra cost to the Government.

c. Slump Testing - In addition to slump tests which shall be made when test specimens are fabricated, at least four slump tests shall be made on randomly selected batches in accordance with ASTM C 143/C 143M for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government's quality assurance representative. Test results shall be plotted on control charts which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, a second test shall immediately be made on the same batch of concrete. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control chart for percent air and the chart for range, and for determining the need for any remedial action. An upper warning limit shall be set at 13 mm below the maximum allowable slump on separate control charts for

percent air used for each type of mixture as specified in paragraph SLUMP, and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at **75 mm**. Samples for slump shall be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the slump at the mixer controlled as directed.

d. Slump Corrective Action - Whenever points on the control chart for slump reach the upper warning limit, an adjustment shall be immediately made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum W/C specified, based upon aggregates which are in a saturated surface-dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting operation shall immediately be halted and the Contractor shall take appropriate steps to bring the slump under control. Also, additional slump tests shall be made as directed. All this shall be at no additional cost to the Government.

e. Temperature - The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064/C 1064M. The temperature shall be reported along with the compressive strength data.

f. Compressive-Strength Specimens - At least one set of test specimens shall be made each day on each different concrete mixture placed during the day. Additional sets of test cylinders shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A random sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased manner. A set of test specimens for concrete with a 28-day specified strength per paragraph DESIGN REQUIREMENTS shall consist of four cylinders, two to be tested at 7 days and two at 28 days. A set of test specimens for concrete with a 90-day strength per specified paragraph DESIGN REQUIREMENTS shall consist of six cylinders, two tested at 7 days, two at 28 days, and two at 90 days. Test specimens shall be molded and cured in accordance with ASTM C 31/C 31M and tested in accordance with ASTM C 39/C 39M. All compressive-strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength tests, moving average for strength, and moving average for range for each mixture. The charts shall be similar

to those found in ACI 214.

3.7.2.7 Inspection Before Placing

Foundation or construction joints, forms, and embedded items shall be inspected for quality by the Contractor in sufficient time prior to each concrete placement to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.7.2.8 Placing

a. Placing Inspection - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement.

b. Placing Corrective Action - The placing foreman shall not permit batching and placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

3.7.2.9 Vibrators

a. Vibrator Testing and Use - The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521 prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined at the same time the vibrator is operating in concrete with the tachometer held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing.

b. Vibrator Corrective Action - Any vibrator not meeting the requirements of paragraph VIBRATORS shall be immediately removed from service and repaired or replaced.

3.7.2.10 Curing

a. Moist-Curing Inspections - At least once each shift, and once per day on nonwork days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist-Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

c. Membrane-Curing Inspection - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square meters per liter. He shall note whether or not coverage is uniform.

d. Membrane-Curing Corrective Action - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. Sheet-Curing Inspection - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. Sheet-Curing Corrective Action - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

3.7.2.11 Cold-Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on nonwork days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

3.7.2.12 Cold-Weather Protection Corrective Action

When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended 1 day.

3.7.2.13 Mixer Uniformity

a. Stationary Mixers - Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 57,000 cubic meters of concrete placed, whichever results in the longest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94/C 94M.

b. Truck Mixers - Prior to the start of concrete placing and at least once every 6 months when concrete is being placed, uniformity of concrete shall be determined in accordance with ASTM C 94/C 94M. The

truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer, the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory.

3.7.2.14 Mixer Uniformity Corrective Action

When a mixer fails to meet mixer uniformity requirements, either the mixer shall be removed from service on the work, the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

3.7.3 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all test and inspection records.

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DIVISION 05 - METALS

SECTION 05502

MISCELLANEOUS METAL

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SECTION 05502

MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(2000) Carbon Structural Steel
ASTM A 53/A 53M	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 320/A 320M	(2000) Alloy Steel Bolting Materials for Low-Temperature Service
ASTM A 467	(1998) Machine and Coil Chain
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 582/A 582M	(1995b) Free-Machining Stainless Steel Bars
ASTM A 588/A 588M	(2000) High-Strength Low-Alloy Structural Steel with 50 ksi (3345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick
ASTM A 653	(2000) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 702	(1989; R 1994e1) Steel Fence Posts and Assemblies, Hot Wrought
ASTM A 780	(2000) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 924/A 924M	(1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM B 32	(1996) Solder Metal
ASTM C 881	(1999) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM F 626	(1996a) Fence Fittings
ASTM F 836M	(1998) Style 1 Stainless Steel Metric Nuts
ASTM F 844	(2000) Washers, Steel, Plain (Flat), Unhardened for General Use
ASTM F 1083	(1997) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1993) Square and Hex Nuts (Inch Series)

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1923	(Rev A) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Miscellaneous Metal Items; G, RE.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: Pipe safely railing, metal fences and gates.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, ASTM A 653, or ASTM A 924/A 924M, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.5 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.6 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

1.7 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for intended use of the item.

2.1.2 Structural Shapes and Plates

Steel bars, shapes and plates shall conform to ASTM A 36/A 36M. Galvanized coatings where required, shall conform to ASTM A 123.

2.1.3 Steel Pipes

Steel pipe shall be zinc-coated steel pipe conforming to the requirements of ASTM A 53/A 53M, Standard Weight, Schedule 40.

2.1.4 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to the applicable requirements of ASTM A 320/A 320M, Grade B8.

2.1.5 Bolts

Bolts shall confirm to ASME B18.2.1. Bolts and anchor bolts shall conform to the applicable requirements of ASTM A 320/A 320M, Grade B8.

2.1.6 Nuts

Nuts shall confirm to ASME B18.2.2. Nuts shall be galvanized.

2.1.7 Expansion Anchors

Expansion anchors shall conform to the applicable requirements of CID A-A-1923. Anchors shall be multiple unit with inside thread.

2.1.8 Concrete, Mortar and Grout

Concrete, motar and grout shall conform to the requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.1.9 Steel Safety Railing, Including Carbon Steel Inserts

Steel safety railing, including inserts in concrete, shall be steel pipe conforming to ASTM A 53/A 53M or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railings shall be 38 mm nominal size. Railings shall be hot-dip galvanized. Pipe collars shall be hot-dip galvanized steel.

a. Joint posts, rail, and corners shall be fabricated by one of the following methods:

(1) Flush type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 10 mm hexagonal recessed-head setscrews.

(2) Mitered and welded joints by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 150 mm long.

(3) Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and the pipe is not crushed.

2.1.10 Chain Safety Gate

Safety chains shall be galvanized welded steel, proof coil chain tested in accordance with ASTM A 467, Class CS. Safety chains shall be straight link style, 5 mm diameter, minimum 39 links per meter (12 links per foot) and with bolt type snap hooks on one end. Eye bolts for attachment of chains shall be galvanized 10 mm bolt with 19 mm eye, anchored as indicated. The safety chain shall accommodate a eye bolt snap as indicated on the drawings.

2.1.11 Wall ladder Rungs

Wall ladder rungs shall be galvanized steel. Steel bars, shapes and plates shall conform to ASTM A 36/A 36M. Galvanized coatings shall conform to ASTM A 123.

2.1.12 Metal Fences and Gate Materials

Metal fence and gate materials (fence posts, gate posts, pickets, and cross pieces shall be galvanized square tubes to the sizes shown on the drawings and in accordance with applicable portions of ASTM A 500 and/or ASTM F 1083 and ASTM A 702. The metal gate components shall be galvanized after fabrication. Care shall be taken to deform picket tubes to the details shown on the drawings without "breaking" the steel. Any tube deformations that demonstrate visible cracking or weaking shall be cause for rejection. The metal gate components shall be galvanized. Galvanizing coatings shall conform to ASTM A 123. Any damage to galvanized surfaces, including welding, cutting or deformed area of galvanizing metal shall be repaired with paint containing zinc dust in accordance with ASTM A 780 or shall be neatly coated with Grade 50B solder conforming to ASTM B 32. Accessories shall be standard commercial or in accordance with ASTM F 626.

2.1.13 Restrictor Plate Materials

Steel plate and tube shall conform to ASTM A 588/A 588M. Threaded rod shall conform to **ASTM A 582/A 582M**. Nut shall conform to ASTM F 836M. Lock Washer and Washer shall conform to ASTM F 844. Epoxy shall conform to ASTM C 881.

2.2 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

2.3 TRENCH COVERS, FRAMES, AND LINERS

Trench covers shall be designed to meet the indicated load requirements. Trench frames and anchors shall be all welded steel construction designed to match cover. Covers shall have flush drop handles formed of 6 mm round stock, and shall be raised-tread, or steel floor plate. Trench liners shall be cast iron with integral frame for cover.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified. Contractor shall submit detailed drawings of miscellaneous metal items. Detail drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings shall include pipe safely railings.

3.2 INSTALLATION OF PIPE GUARDS

Pipe guards shall be set vertically in concrete piers. Piers shall be constructed of, and the hollow cores of the pipe filled with, concrete specified in SECTION 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

3.3 PIPE SAFETY RAILING AND GATES

Pipe Safety Railing and gates shall be galvanized after fabrication in the shop. Care shall be taken to deform pipe without "breaking" the steel. Any pipe deformations that demonstrate visible cracking or weaking may be cause for rejection. The pipe gate components shall be galvanized. Welded, cut, damaged, and deformed area of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32. The Contractor shall grease pipe thoroughly with grease immediately after installation of chains at each gate opening. The Contractor shall examine and certify the operation of all safety pipe railing not sooner then 30 days after installation.

3.3.1 Attachment of Handrails

Splices, where required, shall be made at expansion joints. Removable sections shall be installed as indicated.

3.3.1.1 Installation of Steel Handrails

Installation shall be in pipe sleeves embedded in concrete and filled with molten lead or sulphur with anchorage covered with standard pipe collar pinned to post. Rail ends shall be secured by steel pipe flanges.

3.3.1.2 Mounting of Safety Chains

Safety chains shall be mounted 900 mm and 610 mm above the floor.

3.4 METAL FENCES AND GATES

3.4.1 GENERAL INSTALLATION FOR METAL FENCES AND GATES

Metal fences and gates shall be installed to the lines and grades indicated. The area on either side of the metal fence line shall be cleared to the extent indicated. Line posts shall be spaced equidistant at intervals not exceeding 2.5 meters (8.2 feet). Terminal (corner, and gate) posts shall be set at abrupt changes in vertical and horizontal alignment. Metal cross members and vertical pickets shall be continuous installation between posts. Any damage to galvanized surfaces, including welding, cutting or deformed area of galvanizing metal shall be repaired with paint containing zinc dust in accordance with ASTM A 780 or shall be neatly coated with Grade 50B solder conforming to ASTM B 32.

3.4.2 EXCAVATION FOR METAL FENCES AND GATES

Metal fence and gate post holes shall be cleared of loose material. Waste material shall be spread where directed. The ground surface irregularities along the metal fence line shall be eliminated to the extent necessary to maintain a 150 mm clearance between the bottom of the metal pickets and finish grade.

3.4.3 INSTALLATION FOR METAL FENCE POST

3.4.3.1 Posts for Metal Fences and Gates

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 900 mm (36 inches) in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 900 mm (36 inches) in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 25 mm (1 inch) greater than the largest cross section of the post, for the square tube it is the largest diagonal distance. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts.

3.4.4 CROSS MEMBERS

3.4.4.1 Top Cross Member

Top rail shall be supported at each post by welding as shown in the drawings.

3.4.4.2 Bottom Cross Member

The bottom cross member shall be supported at each post by welding as shown in the drawings.

3.4.5 VERTICAL METAL PICKETS

Vertical metal pickets shall be installed as shown on the drawings. The bottom of the vertical metal pickets shall be 150 mm (6 inches) above the ground.

3.4.6 METAL GATE INSTALLATION

Metal gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. Padlocks shall be attached to gates or gate posts with chains. Hinge pins, and hardware shall be welded or otherwise secured to prevent removal.

3.4.7 GROUNDING FOR METAL FENCES AND GATES

Except as indicated below, metal fences that are electrically continuous with metal posts extending at least 600 mm into the ground require no additional grounding. Other fences shall be grounded on each side of every gate. Fences shall be grounded by means of ground rods every 300 to 450 m of length when fences are located in isolated places, and every 150 to 225 m when in proximity (30 m or less) to public roads, highways, and buildings. The connection to ground shall be made from the post where it is of metal and is electricallsy continuous with the fencing.

Metal fences crossed by overhead powerlines in excess of 600 volts shall be grounded. Metal fence systems crossed by powerlines of 600 volts or more shall be grounded at or near the point of crossing and at distances not exceeding 45 m on each side of crossing. Ground conductor shall consist of No. 8 AWG solid copper wire. Grounding electrodes shall be 19 mm (3/4 inch) by 3.05 m (10 foot) long copper-clad steel rod. Electrodes shall be driven into the earth so that the top of the electrode is at least 152 mm (6 inches) below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 305 mm deep and radially from the fence. The top of the electrode shall be not less than 0.6 m or more than 2.4 m from the fence. Ground conductor shall be clamped to the fence or railing and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and ground rods.

3.4.8 OPERATION FOR METAL FENCES AND GATES

The Contractor shall examine and certify the operation of all metal fences and gates not sooner then 30 days after installation.

3.5 RESTRICTOR PLATE FOR FLAMINGO DETENTION BASIN OUTLET

Restrictor plate for Flamingo Detention Basin Outlet shall be fabricated in the shop as per the drawings. The restrictor plate shall be installed as shown in the drawings.

-- End of Section --

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